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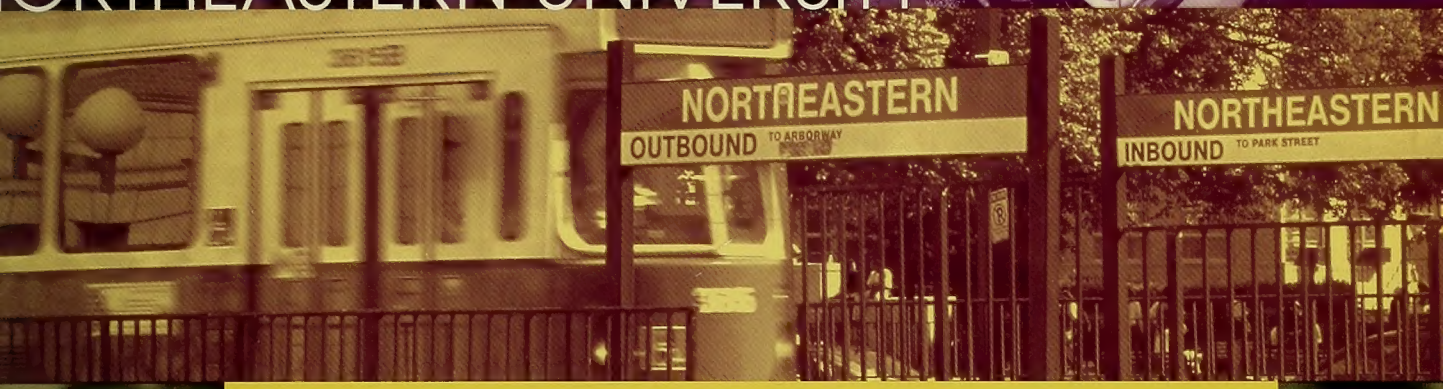
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ORTHEASTERN UNIVERSITY



Undergraduate Catalog

Full-Time Day Programs



1997-1998

Northeastern University

Undergraduate Catalog
Full-Time Day Programs

1997–1998

Northeastern University

Undergraduate Catalog
Full-Time Day Programs

1997–1998

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The University

Admission

Learning about Northeastern

The Office of Undergraduate Admission encourages prospective students to learn more about Northeastern University. For more information on the following programs, or to receive additional publications, contact the office at 617-373-2200 (voice), 617-373-3100 (TTY), or 617-373-8780 (fax). Or write: Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115. You may also access our Home Page on the Internet at http://www.neu.edu.

Information sessions. Sessions are scheduled at 10:00 AM and 2:00 PM, Monday through Friday, year round (except for legal holidays). They include presentations by an admission counselor, an informal question-and-answer period, and a multimedia presentation. Sessions are also held on Saturday mornings from September through June.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admission counselor and to learn more about the University's academic and cooperative education programs. A sign language interpreter can be arranged, with advance notification.

Guided tours. Student-guided tours of the campus are held Monday through Friday and on Saturday mornings from September through June. During July and August tours are held on Monday through Friday. Tours begin at 9:00 AM and leave on the hour, with the final tour at 3:00 PM. No appointments are necessary for either the information sessions or tours. Prospective students needing an accessible route of travel, a sign language interpreter, or other accommodations should inform the Office of Undergraduate Admission in advance of arrival.

College visit program. Prospective students and their parents have the opportunity to visit any one of the undergraduate colleges and schools through the college visit program. Visits are scheduled so that prospective students and their parents may participate in the information session and university tour on the same day.

Open houses. During the fall, late winter, and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admission, cooperative education, student financial services, residential life, student activities, and the University libraries, among other areas.

Admission Policies

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Modified rolling admission. Decisions on admission are made using a modified rolling admission plan, with decisions announced from December 1 to May 1 for those applying for the following fall quarter. Applications are considered complete only if they are accompanied by all required credentials (including first marking-period senior grades and SAT or ACT test scores). In all cases of acceptance, candidates must complete their senior year of high school and submit final transcripts as proof of graduation. Admission is selective and priority is given to candidates who apply by March 1. Most decisions are rendered before May 1.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before graduating from high school. Such students may enroll in either September or January, thereby reducing by one year the time to complete degree requirements. The endorsement of the student's school principal or guidance counselor is required for early admission.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe in writing the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work. Students granted deferred admission will be required to place a $200 tuition deposit to secure their position.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of $200 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their letter of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students requesting on-campus housing must submit a nonrefundable $400 deposit (in addition to the $200 tuition deposit) along with a completed housing application. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students.

Entrance Requirements

Ideally, applicants have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Assessment Test (SAT) or American College Testing Program (ACT) test results, weighs most heavily in the evaluation process.

Secondary School Preparation

Arts, humanities, and social sciences. Students who plan to major in art, theatre, English, foreign languages, music, philosophy, and speech communication should have demonstrated ability in these areas during high school. Candidates who plan to pursue careers in anthropology, economics, history, human services, linguistics, political science, psychology, or sociology should have a well-rounded background in the social sciences. Applicants to the School of Journalism should have worked on writing and producing high school publications or audio- or videotape productions.

Students seeking certification as teachers in early childhood education or elementary education or those planning to major in human services should have demonstrated interest in the behavioral, social, and human sciences.

Business administration. Candidates must have completed a strong preparatory program that emphasized the humanities, social sciences, and natural sciences. Applicants also must have had several years of mathematics, including geometry and Algebra 1 and 2.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, and sciences. Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence usually includes a year of study and laboratory work in biology, chemistry, and physics; and, in mathematics, the sequence includes geometry, Algebra 1 and 2, and a fourth year of trigonometry and/or analysis. Math and science majors also need courses in the social sciences and humanities.

Criminal justice. Applicants should have demonstrated the ability to succeed in their study of the behavioral, social, and human sciences.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, Algebra 1 and 2, and analysis; and a full year of study and lab work in a natural science. Candidates also need courses in the social sciences and humanities.

Entrance Examinations

Freshmen must take the Scholastic Assessment Test (SAT) of the College Board or the American College Testing Program (ACT). Results of these tests may be sent directly to the admission office. The College Board code number for Northeastern University is 3667. When evaluating candidates' SAT scores, the admission office will combine the best verbal and math components, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540 or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing an approved English-as-a-second-language (ESL) course of study, or by receiving B– or above in non-ESL English courses in English-speaking high schools.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the TOEFL (or its equivalent on another examination) must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations. Applicants may take the tests in art (history, studio—general, studio—drawing), biology, chemistry, computer science (A, AB), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus–Horace), mathematics (calculus AB, BC), music (theory), physics (BC mechanics–C electricity, magnetism), and Spanish (language, literature). Applicants who wish to submit scores for advanced placement are required to take the Advanced Placement Tests of the College Board in May.

College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program to evaluate nontraditional college-level education. Northeastern will grant college credit to qualified students according to their CLEP scores. Northeastern is a designated CLEP Testing Center. For more information, contact the Counseling Center at 302 Curry Student Center, 617-373-2142.

Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance to Northeastern. Completion of this form is considered a condition of enrollment. Each student must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titre are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. A positive titre for Hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply

All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable $40 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker.
- Mail the application form and the check to the Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Assessment Test (SAT) or American College Testing Program (ACT)—to be sent to the University. Transfer students who have completed 45 credit hours are not required to submit test scores.
- For priority consideration, applications should be submitted by March 1.
- All materials submitted in conjunction with a student's application become the property of Northeastern University.

International Students

The University welcomes qualified students from other countries. At present, nearly 2,500 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs. The University also welcomes non-matriculated students who wish to improve their English skills by studying at the English Language Center for one or more quarters. The English Language Center also offers counseling and assistance to international students who decide to apply to Northeastern. Admission is contingent upon meeting all University requirements.

In addition to the application process described above, international students must complete the following:

- Submit the Supplementary Form with the application.
- Submit the Declaration and Certification of Finances Form with the application.
- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed.
- Request the testing agency to submit the official results of the Test of English as a Foreign Language (TOEFL). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. A student who attends and successfully completes the course of study offered by Northeastern University English Language Center (ELC) and obtains a "Pass" or a "Release" from the ELC is not required to submit TOEFL scores.
- Request the testing agency to submit the official results of the Scholastic Assessment Test (SAT). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. An applicant who has successfully completed 45 credit hours is not required to submit SAT scores.
- After acceptance, submit the required nonrefundable tuition deposit of $200. Upon receipt of the tuition deposit, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in a regionally accredited college, university, or technical institute or have earned an associate's degree from a regionally accredited two-year college or other two-year program may seek admission as an upperclass student.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four quarter hours. Students who successfully complete 48 quarter hours generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have or will have completed 30 credit hours of college work successfully. In addition, transfer candidates must

- indicate their choice of college and major on the application
- request that an official copy of their high school transcript and/or General Equivalency Diploma (GED) test scores be sent to the Office of Undergraduate Admission
- request that an official transcript from each college attended be sent to the Office of Undergraduate Admission directly from the registrar's office of the respective colleges
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course)
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement

Transfer candidates should apply by March 1 for priority consideration. Applications will be reviewed on a space-available basis.

Cooperative Education

Robert E. Vozzella, EdD, *Vice President*
Kristin R. Woolever, PhD, *Interim Dean*
Candace A. Herene, BA, *Assistant Dean*
Patricia A. Venter, BS, *Diversity Coordinator*

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Elizabeth A. Chilvers, MEd
Kathleen L. Finn, EdD, RN
Joyce K. Fletcher, MEd, DBA
Mary R. Flynn, MEd, RN
Ann M. Galligan, EdD
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Rosemarie DiMarco, MS
Lisa M. Doherty, MA
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Karen P. Kelley, MEd
Barbara E. Lechner, MEd
Jacqueline F. Sweeney, MS
Martha L. Wengert, MEd
Felicia P. Wiltz, MEd
William E. Wray, JD

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Alicia A. Canali, MEd
Jacqueline Diani, MEd
William J. Doherty, MA
Jeffrey A. Doughty, BS
Ellen Duwart, MEd
Mark Erickson, MEd
Nancy B. Goldin, MEd, PT
Mary Jane Grusemeyer, MS
Helen C. Mann Ries, MEd
Karen L. Nelson, MArch
Catherine A. Riley, MA
Behrooz (Barry) Satvat, PE, ScD
Nancy Waggner, JD
Scott Weighart, MBA
Francis M. Williams, MEd
Stephen Williams, JD
Mark L. Yorra, RPh, MS

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For most programs, cooperative education is a degree requirement. The University assists in providing relevant cooperative education experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and employers.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom study. Co-op students have opportunities to evaluate career decisions early in their college years, while gaining meaningful work experience before graduation and establishing valuable professional contacts and references. Students also earn experiential learning credit by satisfactorily completing the required components of the cooperative education learning process, and the salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Participation in co-op is required of all students except those in the College of Arts and Sciences. Even so, most arts and sciences students nonetheless choose to take advantage of co-op.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science also offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with cooperative education faculty who assist students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as traveling abroad, doing volunteer work, or taking specialized courses at another institution.

International Cooperative Education

The Department of International Cooperative Education offers a variety of services to international students as well as to U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, New Zealand, and Israel for students who have the appropriate background and experience.

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries to work for American and national companies on co-op, especially those countries located in the Pacific Rim region.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Summer Orientation

Undergraduate students entering the University in the fall quarter will participate in summer orientation. This required program is a valuable opportunity to prepare for a successful academic career at Northeastern University. During the months of July and August, new students and transfer students will attend a selected orientation session designed to meet their particular needs. Several of the sessions are designated for new students; others are designated for transfer students. Each of Northeastern's schools and colleges is assigned to specific sessions. Participants will attend a session hosted by the school or college to which they have been admitted.

The summer orientation staff includes orientation leaders, students who will serve as valuable sources of information and assistance throughout the program. In addition to the orientation leaders, staff and faculty from various campus offices and your school or college will be available to answer questions and to provide assistance in making arrangements for the fall. During summer orientation, participants will complete placement exams, meet with representatives from their school or college to develop a fall class schedule, register for classes, and obtain a student identification card. Participants will also learn about life at Northeastern, including services and opportunities that will assist with their transition to the University. In addition, participants will be able to contract for meal plans and complete arrangements for campus housing. The schedule also includes opportunities to tour the campus and participate in activities with other students. Student participants will stay in a campus residence hall during summer orientation. Parents/family will participate in a separate but parallel program and will also be invited to stay in a campus residence hall during this session. Registration information will be mailed to incoming students who have paid their tuition deposit. See page 17 for summer orientation fee information.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 AM to 5:10 PM, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform the dean of students and his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement that he/she may have missed because of such absence on any particular day; provided, however,

that such make-up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

Fall, Winter, and Spring Schedule

	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTTh	1:35–2:40
	Sequence 5	MTTh	2:50–3:55
	Sequence 6	MTTh	4:05–5:10
	Sequence 7	TF	8:00–9:05
		W	1:35–2:40
	Sequence 8	TF	9:15–10:20
		W	2:50–3:55
	Sequence 9	TF	10:30–11:35
		W	4:05–5:10
	Sequence 10	TWF	11:45–12:50
Business Students	Sequence A	MW	8:00–9:40
	Sequence B	W	1:45–3:25
		F	8:00–9:40
	Sequence C	MW	9:55–11:35
	Sequence D	TF	11:45–1:25
	Sequence E	TTh	1:45–3:25
	Sequence F	W	3:30–5:10
		F	9:55–11:35
	Sequence G	TTh	3:30–5:10
	Sequence H	M	3:30–5:10
		F	1:45–3:25
	Sequence I	M	1:45–3:25
		W	11:45–1:25
	Sequence J	TTh	9:55–11:35
	Sequence K	TTh	8:00–9:40

Summer Schedule

	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTh	11:45–12:50
		W	1:00–2:05
	Sequence 5	MTh	1:00–2:05
		W	2:15–3:20
	Sequence 6	MTh	2:15–3:20
		W	3:30–4:35
Business Students	Sequence A	MW	8:00–9:40
	Sequence B	MW	9:55–11:35
	Sequence C	TTh	8:00–9:40
	Sequence D	TTh	9:55–11:35
	Sequence F	M	1:45–3:25
		W	2:15–3:55
	Sequence G	TTh	11:45–1:25
	Sequence H	TTh	1:45–3:25
	Sequence I	TTh	3:30–5:10

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:25 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of Student Affairs or to the Student Government Association.

Grading System

Grades are officially recorded by letters, evaluated as follows.

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A–	3.667	
B+	3.333	
B	3.000	Good achievement
B–	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C–	1.667	
D+	1.333	
D	1.000	Poor achievement
D–	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
X		Incomplete in a pass/fail course
NE		Not enrolled. Did not attend after the date of record, the start of the second full week.
IP		Course in progress. Intended for courses such as Senior Thesis or a project that extends over several quarters. An IP can be replaced by a regular grade with a standard change-of-grade card. The time restrictions on the I grade do not apply to the IP grade. While unchanged, it is not included in computing the GPA. If never changed, the course does not count toward graduation requirements.

An I or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, S, and U are not included in the calculation of the quality-point average.

Credit hours. Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the dean's office of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.

- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.
- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Quarterly status reports. Grades are mailed to students approximately three days after each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor. Take up the matter of a missing or erroneous grade directly with the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C–. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Procedure for clearing an I or changing other grades. An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1986, the University policy has been that any grade outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Students can make up failures by repeating the same course in the full-time day program. Both grades remain on the transcript but only the new grade is used for calculation of quality-point average. With permission from their dean's office, students may substitute an appropriate different course taken in the full-time day program or elsewhere. Credits earned elsewhere, including University College, are treated as transfer credits. Grades below C are not accepted for transfer credit.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board and the student information kiosks. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the Office of the Registrar, 120 Hayden Hall, but only if reported before the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed postcard with the final examinations in order to receive grades early.

Academic Progression Standards

Each college establishes academic progression standards for its own undergraduate students. To progress from one academic year to the next, students must meet the minimum quality-point average(s) (QPAs) and number of earned quarter hours required by their college/program. In addition, many programs require that specific courses be successfully completed to progress to the next year. Students who do not make satisfactory progress will not graduate with their class and may be withdrawn. For more information about academic progression standards for each college, program, or major, please refer to curriculum guidelines, which can be found either in individual college guidebooks or in the college sections of this *Undergraduate Catalog*, starting on page 26.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor and selection as the class marshal (June only) are reserved for students who have been registered at Northeastern University for at least seventy-two quarter hours.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (*cum laude*)
3.50–3.74	Graduation with high honor (*magna cum laude*)
3.75–4.00	Graduation with highest honor (*summa cum laude*)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Freshmen and upperclass students should consult the office of the dean of the college to which they want to transfer. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space. Deadlines are at the discretion of the colleges.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of sixteen quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middlers, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload policies. Inasmuch as withdrawal from a course can be accomplished up to the eighth week, no rebate or credit is granted when a student voluntarily drops a course. An exception can be made if the withdrawal takes place during the first week, but a student should raise the issue at that time.

Students who enroll in overload courses will be billed at the overload rate, 1/16 of the tuition for that quarter, per quarter hour.

Any upperclass student taking a full course load may elect to take an additional enrichment course without charge. No credit is given for this course. The procedure for taking this course is as follows: Confer with your dean or his or her designee to establish eligibility under the conditions that this course will be a four-quarter-hour basic college course; be the only such tuition-free course permitted during the upperclass academic year; be in addition to the normal course load for the quarter; be on a space-available basis on registration day, with priority given to tuition-paying students; not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours.

Should you later petition to have credits earned in this course apply to your degree, you must: (a) obtain the approval of your dean or his or her designee; (b) pay tuition at the rate current at the time of petition; and (c) complete the process by May 1 of your senior year. After you and the dean or his or her designee have filled out and signed the necessary form, take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Division conflicts. Students who are in the wrong division for a given quarter will be purged from all preregistered courses for that quarter unless their division assignment is correct one month prior to the start of that quarter. Students must contact their college dean's office and/or Cooperative Education to correct their status.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean or the department that offers the course. After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Registrar, Bursar, or Financial Aid promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the transcript office at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone and fax requests are not accepted, and no transcripts can be faxed from the University. Currently enrolled students can obtain unofficial transcripts in person from the student information kiosks located around campus. Students not currently enrolled can obtain an unofficial transcript in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Students should contact the office of the dean of their college. Students wishing to transfer should consult the dean's office for their school or the Office of Student Affairs.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from coursework (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

Northeastern University is eager to assist you in developing a plan for financing a Northeastern education. Through a variety of options—financial aid, alternative loans, Northeastern's Monthly Payment Plan, and your own resources—a plan can be designed that will make your education costs affordable.

Financial Aid
For many families, financial aid is a major element in making Northeastern University affordable. The Office of Student Financial Services provides a full range of options that help undergraduate and graduate students finance their educations. To take advantage of Northeastern's financial aid programs, freshmen must submit the FAFSA and PROFILE forms and upperclass students must submit the FAFSA and NU Upperclass Application. For more information, please contact our Office of Student Financial Services at 617-373-3190.

Student/Parent Loans
In addition to the federal loans that may be on your Offer of Financial Assistance, there are additional loans that can assist you in financing your Northeastern education. Federal PLUS loans for parents/guardians are available at competitive interest rates; you may borrow up to the cost of your education less any financial aid or loans you are receiving. The MASSPlan, a family loan program, is available to all Northeastern families (regardless of state of residence) once eligibility requirements are met. For information about these and additional borrowing options, please contact our Loan Office at 617-373-3386.

Northeastern's Monthly Payment Plan
If you are interested in using a budget system to pay for part or all of your costs, you may be interested in Northeastern's Monthly Payment Plan. This plan allows you to pay in twelve, eleven, ten, or nine monthly installments, depending on when you enroll in the payment plan. Contact Academic Management Services at 1-800-635-0120 or the Bursar's Office at 617-373-2270 for further information.

Payment Methods and Due Dates

The following are accepted methods of payment.
- Check or Money Order made payable to Northeastern University.
- Mastercard, Visa, American Express, or Discover. Payments may be made by calling our 24-hour automated charge line, 617-373-2319 or, outside the (617) area code, 1-800-937-4067.
- Enrollment in Northeastern's Monthly Payment Plan.

Full payment of tuition, residence hall fees, and other related charges are due prior to the start of each academic quarter. The payment due dates are as follows.

Fall Quarter	
Freshmen	August 1
Upperclass	August 19
Winter Quarter	
Freshmen and Upperclass	November 25
Spring Quarter	
Freshmen and Upperclass	February 26
Summer Quarter	
Freshmen and Upperclass	May 19

Students are responsible for the prompt payment of all bills. If you have not received a bill by the first week of the quarter, please contact the Bursar's Office and a bill will be generated for you.

Any discrepancies on your bill should be brought to the attention of the Bursar's Office in writing within thirty days. If there is a billing problem, pay the undisputed portion of the bill to avoid any additional late fees.

Overloads/Reduced loads. Undergraduate tuition is charged at a flat rate. Full tuition is based on 12 quarter-hours of credit; a reduced load is processed when students go below this number. An overload is charged for amounts exceeding the normal program load (this number is not the same every quarter and varies by college/program/year). Students registered full-time may register for an additional one quarter-hour course without an added charge.

Delinquent balances. In cases of student default on tuition payments, the student is liable for the outstanding tuition as well as for all reasonable collection costs and any legal fees incurred by the University during the collection process. Accounts may be subject to monthly interest charges. ***Transcripts and other academic records will not be released until all financial obligations to the University have been met.***

Tuition, Room, Board, and Fees Per Quarter 1997–1998 Academic Year

At Northeastern University, the academic year consists of four quarters. Full-time freshmen spend three quarters in classes and a summer term on co-op or on vacation. Full-time upperclass students typically spend two quarters in classes and two quarters on co-op.

The total costs for students living in our residence halls and enrolled in the 19-meal plan are as follows:

Tuition and fees per quarter	Freshman	Upperclass
Tuition	$5,440.00	$7,015.00
Student center fee	50.00	50.00
Student activities fee	13.50	13.50
Health service fee	577.50	577.50
Room, board, and fees per quarter		
Residence activity fee	$15.00	$15.00
Housing	1,450.00*	1,450.00*
Nineteen-meal plan	1,290.00	1,290.00
Total cost per quarter	8,836.00	10,411.00
Total annual cost	$25,353.00	$20,244.50
(Freshmen: three quarters in school; upperclass: two quarters in school)		

*Rates vary depending on occupancy and assignment. See Room and Board.

The total costs for commuting students are as follows:

Tuition and fees per quarter	Freshman	Upperclass
Tuition	$5,440.00	$7,015.00
Student center fee	50.00	50.00
Student activities fee	13.50	13.50
Health service fee	577.50*	577.50*
Total cost per quarter	6,081.00	7,656.50
Total annual cost	$17,088.00	$14,735.50
(Freshmen: three quarters in school; upperclass: two quarters in school)		

*Students may waive health service. See university health insurance.

In addition to the expenses itemized above, families should plan on the normal costs of living that students incur for transportation, books, and personal expenses. These vary widely depending upon such things as lifestyle and distance from home, but for the purpose of approximating a student budget, the University estimates these items at $2,250/year for residents and $1,890/year for commuting students.

Tuition rates, room and board charges, and fees are subject to revision by the board of trustees at any time.

The following fees are required of all students.

Application fee. This nonrefundable $50 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of $200, which is applicable towards the first quarter's tuition, is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their letter of acceptance.

Summer orientation fees. Summer orientation registration materials will be mailed to incoming students who have paid their tuition deposit. The summer orientation is a mandatory program for all new and transfer students enrolled in classes for the fall quarter. A nonrefundable fee must accompany the student registration for summer orientation. This fee covers all program materials, meals, and housing. The fee is $140 for new students and $115 for transfers. Session changes once assigned will increase the fee by $10 to cover related administrative costs. Students should contact the Office of New Student Orientation and Commuter Services if they wish to make payment arrangements for their summer orientation fee. Each parent or family member who will attend the parents/family summer orientation program must also include the nonrefundable fee of $115 with his or her registration.

Student services fee. Students pay a $50 quarterly student center fee to support the Curry Student Center and a $13.50 quarterly student activities fee to support student clubs.

Photo-identification card. This card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs $5.

University health insurance. The University provides hospital insurance for all students who have matriculated, are carrying a course load of nine credits or more, or who are in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Bursar's Office. Deadlines for waiving are applicable. A waiver form must be completed annually at the start of each academic year.

Sports pass fee. This $45 fee ($25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following:

Housing pre-payment. New students seeking on-campus housing must submit a nonrefundable $400 pre-payment along with a completed housing application form to complete the housing application process. The upperclass housing pre-payment is $200 for one quarter or $150 per quarter for two or more quarters.

Residence hall activities fee. All students living in the residence hall system pay a quarterly $15 fee for activities sponsored by the Residence Student Association.

Late fees. All accounts not paid in full by the indicated due dates will be subject to a late fee of $200.

International student fee. A one-time fee of $200 is charged to new undergraduate international students, payable after their acceptance at Northeastern University. The fee supports services available at the International Student Office.

Laboratory fees. Students taking laboratory courses will be charged for laboratory cards. The laboratory card fee will be applied to the tuition bill. Rates for the laboratory cards are as follows:

Arts and Crafts Laboratory	$25	Film Courses Laboratory	$30
Arts Studio Laboratory	$35	Media Studio Laboratory	$35
Biology Laboratory	$50	Medical Laboratory/Science Laboratory	$35
Chemistry Laboratory	$65	Photography Laboratory	$50
Computer Graphics Laboratory	$50	Radiology Laboratory	$25
EMT/Paramedic Laboratory	$25		

Liability insurance. Liability insurance must be carried by students as required by the academic program. This fee of $18 is charged once per year.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen meals per week option ($1,290). Once on campus, freshmen may select either a ten or fifteen meal plan option.

Returning upperclass students must apply for housing each quarter.

Standard Residences (per quarter)

Residence Halls	Single	Double	Triple
Kerr	$1,650	$1,450	
Light	$1,650	$1,450	$1,325
Melvin	$1,650	$1,450	$1,325
Smith	$1,650	$1,450	$1,325
Speare	$1,650	$1,450	
Stetson	$1,650	$1,450	$1,035
White Hall	$1,650	$1,450	

Suites	Single	Double	Triple
Kennedy Hall	$1,650	$1,450	$1,035
153 Hemenway		$1,450	$1,325

Apartments	5 Bed/dbl	6 Bed/dbl	8 Bed/dbl
Loftman Hall	$1,620	$1,585	$1,500

Apartments	Single	Double	Triple	Quad
Burstein Hall	$1,975	$1,580	$1,350	$1,325
Rubenstein Hall	$1,975	$1,580	$1,350	$1,325
319 Huntington	$2,025	$1,300	$1,440	$1,060
337 Huntington	$2,025	$1,600	$1,440	$1,060
St. Stephens St. Apartments	$2,025	$1,580	$1,440	$1,350
Willis Hall				$1,550/$1,750*

*Non-renovated apartments

The rates listed above are for standard room accommodations only. Rates can vary based upon adjusted capacities and room size or occupancy.

Freshman residence termination fee. Students who sign the license agreement are required to live on campus for the terms of the agreement. Students who fail to honor their agreement will be subject to a termination fee of 50 percent of subsequent quarters room charge.

Other residence rate adjustments. Students who terminate their license agreements before the third quarter, either voluntarily or involuntarily, will be assessed charges as outlined in the Residence Hall and Dining License Agreement.

Residence rate adjustments may be made provided specific conditions are met and a housing withdrawal form has been filed with Residence Life Office. Details regarding these conditions may be found in the Residence Hall and Dining License Agreement.

Freshmen and transfer students should refer to the Residence Hall and Dining License Agreement for specific rate adjustment information.

The standard adjustment rates for upperclass and upperclass graduate students are:

During the first week	75 percent credit
During the second week	50 percent credit
During the third week	25 percent credit
After the third week	no credit

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter	
19	$1,290	
15	$1,165	
10	$1,050	
5	$ 520	upperclass only

Husky account. Students may deposit funds into a dining plan, which allows them to "drawdown" from the account to purchase food or other items available at specific locations throughout the campus. Contact the Husky Card office at 617-373-8322 for additional information.

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievements. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office and also appears in the registrar's course listings.

There are two other types of honors courses. *Honors within a standard course* are activity courses that allow students to substitute special work for some of the standard assignments within the course. *Honors outside a standard course* are adjunct courses that carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Activity and adjunct courses only appear on the listing in the honors program office. Because they do not carry separate numbers, activity and adjunct courses do not appear as honors-level in the registrar's course listings. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurricular cultural and recreational activities. Students may choose special honors housing in 115–119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

For academic credentials to be considered for the following scholarships, a completed admissions application should be submitted no later than January 1 preceding Fall enrollment.

Merit Scholarships

Ambassador Award. The University offers five half-tuition scholarships for exceptional academic achievement to non-U.S. citizens for the freshman year (September through June). The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are not renewable.

Boston Youth Leadership Award. *Award:* $6,500 grant for campus room and board. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.0. *Eligibility:* Applicants for fall freshman admission to Northeastern University who have demonstrated outstanding community leadership and service and who will graduate in the top quarter of their class at a Boston public, private, or parochial school. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Carl S. Ell Scholarship. *Award:* Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.25. *Eligibility:* Applicants for fall freshman admission to Northeastern University who will graduate from high school in the top 5 percent of their graduating class with a combined math and verbal score of 1250 or higher on the Scholastic Assessment Test (SAT). Awardees must reside on campus, maintain enrollment in the Honors Program, and follow procedures to receive state and/or federal education grants to which they may be entitled.

Northeastern University Merit Scholarship. *Award:* Full tuition scholarship plus $2,000 for campus room and board. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.25. *Eligibility:* Awards guaranteed to National Merit Scholarship program finalists and semi-finalists who reside in the six New England states, graduate in the top 15 percent of their high school class, and complete the financial aid and admission application process by stated deadlines. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Ralph J. Bunche Scholarship. *Award:* Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are African American and who will graduate from high school in the

top 10 percent of their graduating class with a combined math and verbal score of 1150 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Reggie Lewis Memorial Scholarship. *Award:* Full tuition scholarship plus $2,000 campus room and board grant. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are members of a federally designated ethnic minority group and will graduate from high school in the top 20 percent of their graduating class with a combined math and verbal score of 1150 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Compensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, Freshman English 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000	Mathematical Preliminaries 1
ENG 1110	Freshman English 1†
or	
ENG 1013	Fundamentals of English 1

Winter*

MTH 1010	Mathematical Preliminaries 2
ENG 1111	Freshman English 2

Please note that successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for:

MTH 1101, MTH 1106, MTH 1107, and MTH 1108	Nonbusiness mathematics sequence; and
MTH 1113 and MTH 1114	Business mathematics sequence

A passing letter grade in Freshman English 1 or Intensive Writing is a prerequisite for:

ENG 1111	Freshman English 2

*The same sequence is offered winter/spring for students who enter in January.
†Students whose work in this course is unacceptable for success in ENG 1111, Freshman English 2, will receive a grade of U and must repeat ENG 1110.

Schedule for Continuation of Compensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no designates non-acceptance, and an n/a, not applicable.

	English 1 (ENG 1110/1013)	**English 2** (ENG 1110/1111)	**Mathematical Preliminaries 1*** (MTH 1000)	**Mathematical Preliminaries 2*** (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science[1]	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes[2]	yes[2]
Engineering[1]	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes[3]	yes	no	no

[1]This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.
[2]Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.
[3]This college will accept ENG 1110 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Training Program

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-373-2372.

Army

Richard W. Lacroix, Lt. Col., U.S. Army, MS, *Professor and Chair, Department of Military Science*

Assistant Professors
William J. Callahan, Maj., MA
Kerry M. Granfield, Capt., BA
Stephen E. Herring, Capt., BA

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middler, junior, and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent), or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a $150-per-month stipend while in school. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. The Army ROTC scholarship program is a tiered system, offering $12,800, $9,000, $5,000, and $3,000 scholarships. Scholarship students also receive allowances for textbooks and a $150-per-month stipend while in school.

Transfer students, whether or not previously enrolled in ROTC, are welcomed to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

Air Force

Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1501, or call 617-353-4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur an eight-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character, and successfully complete a six-week field training encampment during the summer before the start of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to college freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships.

Navy Nursing Program

Michael L. McHugh, Capt., U.S. Navy, MS, *Professor and Chair, Department of Naval Science, Boston University*

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Nursing students wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a $150 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a $150 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years, college-program students for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each major description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

Alternative Freshman-Year Program		249 Ryder
College of Arts and Sciences, Dean's Office		400 Meserve
Academic Program Offices	African-American Studies	132 Nightingale
	American Sign Language–English Interpreting	276 Holmes
	Anthropology	501 Holmes
	Art and Architecture	239 Ryder
	Behavioral Neuroscience	125 Nightingale
	Biochemistry	414 Mugar
	Biology	414 Mugar
	Chemistry	102 Hurtig
	Communication Studies	147 Meserve
	Economics	301 Lake
	Education	54 Lake
	English	406 Holmes
	Geology/Environmental Geology	14 Holmes
	History	249 Meserve
	Human Services	210 Lake
	International Affairs	303 Meserve
	Journalism	102 Lake
	Linguistics	565 Holmes
	Mathematics	567 Lake
	Modern Languages	360 Holmes
	Music	351 Ryder
	Philosophy and Religion	103 Meserve
	Physics/Applied Physics	111 Dana
	Political Science	303 Meserve
	Psychology	125 Nightingale
	Sociology	500 Holmes
	Theatre	337 Ryder
Bouvé College of Pharmacy and Health Sciences		206 Mugar
College of Business Administration		250 Dodge
College of Computer Science		161 Cullinane
College of Criminal Justice		400 Churchill
College of Engineering		220 Snell
College of Nursing		102 Robinson
School of Engineering Technology		120 Snell

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Office of the Registrar, 120 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university or University College may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617-373-2512.

Intermediate Writing	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop specified for major	ENG 1340
Writing for the Health Professions	ENG 1380
Advanced Writing	ENG 1352
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Pharmacy and Health Sciences (PAH)	ENG 1350 or ENG 1340
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125 or ENG 1340
School of Engineering Technology (ENG'G)	ENG 1340
College of Nursing	ENG 1380

Diversity Requirement

In 1995 the Student Government Association proposed to the Faculty Senate that a diversity requirement become part of the curriculum for every student at the University, and the Faculty Senate adopted this proposal. Northeastern University requires all students to complete before graduation three or more credits or to participate in a program (including but not limited to overseas co-op, study abroad, and involvement in student activities and diversity training) deemed as satisfying the diversity requirement. Each college has developed its own program to satisfy this requirement. Please consult your college for the details of its program.

The Academic Common Experience

Formally approved by the Northeastern faculty in 1995, an initiative known as the Academic Common Experience will be integrated into all programs of study over the next several years. Under the initiative, curricula will be reviewed and revised with the goal of helping all Northeastern undergraduates achieve certain skills, competencies, and understandings during their years at the University.

The Academic Common Experience encourages the development of communication skills, critical and creative thinking, information literacy, and interpersonal skills. It also emphasizes the importance of developing historical, ethical, aesthetic, and personal perspectives, and of understanding the contexts provided by the natural, social, and cultural worlds (including a multicultural understanding).

In addition, it seeks to train students to make logical connections, between theoretical and applied knowledge, for instance, or between academic study and the world of work.

A complete description of the Academic Common Experience is available through the Student Government Association.

Undergraduate Degrees

College of Arts and Sciences

Bachelor of Arts

Bachelor of Science

Majors
Concentrations
Minors

African-American Studies
Cultural Studies
Historical Studies
Social/Behavioral Studies
African-American Studies

American Sign Language–English Interpreting[1]

Anthropology
Anthropology

Applied Physics[1]

Art
Architecture
Graphic Design
Art

Behavioral Neuroscience
Neuroscience

Biochemistry[1]

Biology

Chemistry
Chemistry

Communication Studies
Speech and Rhetoric
Organizational Communication
Radio and Television
Communication Studies

Economics
Economics

Education (Programs)
Early Childhood Education
Elementary Education
Secondary Education

English
Creative Writing
Literature

Environmental Geology
Environmental Geology

Geology
Geology

History
History

Human Services
Human Services

Independent Studies

International Affairs
International Affairs

Journalism
Advertising
Newspaper/Print
Public Relations
Radio/Television News

Linguistics
Linguistics

Mathematics
Mathematics

Modern Languages
French
German
Italian
Russian
Spanish
French
German
Italian
Russian
Spanish

Music
Music Industry[1]
Music Literature[2]
Music Literature and Performance[2]
Music
Music Industry

Philosophy
Philosophy
Religious Studies

Physics
Physics

Political Science
Law and Legal Issues
Public Administration
Political Science

Psychology
Psychology

Sociology
Sociology

Theatre
Theatre Generalist
Production
Performance
Theatre

Interdisciplinary Minors
Asian Studies
Cinema Studies
International Affairs
Jewish Studies
Latino, Latin American, and Caribbean Studies
Linguistics
Marine Studies
Media Studies
Technical Communication
Urban Studies
Women's Studies

[1]Bachelor of Science only
[2]Bachelor of Arts only

Bouvé College of Pharmacy and Health Sciences

Associate in Science

Bachelor of Science

Doctor of Pharmacy (6-year program)

Majors
Concentrations
Minors

Athletic Training

Cardiopulmonary Sciences
Cardiovascular Technology
Exercise Physiology
Respiratory Therapy

Cardiovascular Health and Exercise

Medical Laboratory Science
Medical Laboratory Science

Rehabilitative Science

Additional Degrees

Associate in Science in Dental Hygiene

Bachelor of Science in Dental Hygiene

Bachelor of Science in Pharmacy

Bachelor of Science in Physical Therapy

Bachelor of Science in Speech-Language Pathology and Audiology

Bachelor of Science in Toxicology

College of Business Administration

Bachelor of Science in International Business

Bachelor of Science in Business Administration

Concentrations

Accounting

Entrepreneurship and New Venture Management

Finance and Insurance

Human Resources Management

International Business Administration

Logistics and Transportation

Management

Management Information Systems

Marketing

Minor

Business Administration

College of Computer Science

Bachelor of Science

Bachelor of Arts

College of Criminal Justice

Bachelor of Science

Concentrations

- Criminology and Corrections
- Legal Studies
- Policing and Security

College of Engineering

Bachelor of Science

Bachelor of Science in Chemical Engineering

Bachelor of Science in Civil Engineering

Bachelor of Science in Electrical Engineering

Concentrations

- Electrical Engineering
- Computer Engineering
- Power Systems

Additional Degrees

Bachelor of Science in Industrial Engineering

Bachelor of Science in Mechanical Engineering

Bachelor of Science/Master of Science in Electrical Engineering

Bachelor of Science/Master of Science in Industrial Engineering

Bachelor of Science/Master of Science in Mechanical Engineering

College of Nursing

Bachelor of Science in Nursing

School of Engineering Technology	Bachelor of Science in Engineering Technology
Majors	**Aerospace Maintenance Engineering Technology**
	Computer Technology
	Electrical Engineering Technology
	Mechanical Engineering Technology
Minors	*Computer Technology*
	Electrical Engineering Technology
	Mechanical Engineering Technology

College of Arts and Sciences

Robert P. Lowndes, PhD, *Dean*
Timothy Donovan, PhD, *Associate Dean, External Affairs*
Kay D. Onan, PhD, *Associate Dean, Faculty Affairs*
Malcolm D. Hill, PhD, *Associate Dean, Undergraduate Affairs*
Mary Mello, MA, *Director, Academic Administrative Services*
Lisa Nefussy Fein, MEd, *Assistant Director, Academic Administrative Services*
Gail F. Leclerc, MEd, *Academic Adviser*
Todd Rich, MS, *Coordinator, International Study Programs*
Gail Stubbs, MEd, *Coordinator, Undergraduate Student Services*
Jan Swindlehurst, MFA, *Coordinator, Undergraduate Student Services*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices. The college also emphasizes experiential education through co-operative education, service-learning, and other kinds of internships, student-faculty research collaborations, and study abroad.

In most programs, students may choose a three-year intensive, or a four- or five-year experiential education plan. The five-year plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language or American Sign Language. The Bachelor of Science degree requires fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major, and the college offers a number of specific integrated dual major programs. Students who pursue either a double major or an integrated dual major are allowed unlimited double counting between their major and core curriculum courses. Students whose double major involves a BA and BS degree or two BA degrees may do the BS version of the core curriculum but must still complete the foreign language requirement.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. Some majors have additional requirements in order to progress from year to year. For further details, refer to the *College of Arts and Sciences Guidebook* available from the dean's office, 400 Meserve Hall.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts (BA) or Bachelor of Science (BS) degree must successfully complete a minimum of 176 quarter hours. In addition, a combination of no more than 4 quarter hours of (1 or 2 credit) physical education activity courses or ROTC credits may be used to meet this requirement.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in

progress at the time of application, the student must submit an updated official transcript for review once grades for the courses have been posted. Students should contact a major or dean's office adviser prior to enrollment or during their first quarter to have transfer credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the College of Arts and Sciences dean's office, 400 Meserve Hall.

Core curriculum. All students in the College of Arts and Sciences must complete the college's core curriculum in order to graduate. The college believes that there are important areas of inquiry with which all students should have experience. The core curriculum is a set of course requirements intended to provide the breadth of experience essential to a well-rounded individual and the broad base of knowledge traditionally associated with a liberal arts education.

All students receive instruction in fundamental English and mathematics. In addition, students pursuing the Bachelor of Arts degree study a foreign language. The core curriculum is meant to complement students' major programs by providing opportunities to explore a range of disciplines in the arts and humanities, social sciences, and mathematics and sciences, as well as to learn the issues, perspectives, and analytical tools used in these domains. The core also familiarizes students with areas and approaches to learning not available strictly through their own major.

Students explore Western cultural history as it has shaped our society and the traditions of non-Western cultures that are becoming increasingly important in an interconnected world. The core curriculum introduces historically important work views, theories, and changes in intellectual history, as well as current issues and problems facing contemporary society.

The core curriculum has the additional function of providing students with crucial skills useful in all areas of study and in future life endeavors. Every course within the core emphasizes writing proficiency, analytical thought, and methods of inquiry. Writing is the key to communication and is necessary for clear thinking and the expression of one's ideas; methods of inquiry comprise ways of learning; and analytical thought comprises logical thinking, which is the construction of valid arguments. Instruction in core courses strives to emphasize all these skills, which form the basis of a well-educated and intellectually skilled student who can apply his or her talents in whatever field of endeavor s/he chooses to undertake.

The core curriculum consists of six categories:

Category I Basic Skills
- Freshman English (two or three courses depending on placement level upon entry to the University)
- College mathematics (one to three courses depending on placement level upon entry to the University)
- Modern language or American Sign Language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry
Category III The Western Cultural Heritage
Category IV Alternative Cultures and Societies
Category V Theoretical Perspectives and Changes
Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the appropriate department or the Office of the Dean, 400 Meserve Hall.

Descriptions for all College of Arts and Sciences courses begin on page 126. Courses approved for the college's core curriculum are noted in parentheses at the end of the appropriate course descriptions. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Office of the Dean, 400 Meserve Hall, provides a list of courses that may be used to fulfill each category requirement and more specific details on the core curriculum.

Experiential Education Requirement. All Arts and Sciences students who entered the college as freshmen in or after the fall of 1995 and transfer students who will graduate in or beyond the year 2000 are required to fulfill a college experiential education requirement. This requirement is made up of two components: 1) an approved learn-by-doing experience (e.g., co-op, internships, fieldwork or practica, study abroad programs, service-learning projects, and others) and 2) an academic course that is designed to allow the student to reflect upon the experiential component. Students are considered to have fulfilled the college's experiential education requirement only when both components have been satisfactorily completed. Although the experiential requirement does not necessarily have to be fulfilled in the student's major, each department does have specific ways for its students to fulfill the requirement.

The experiential education requirement should generally be completed during the middler, junior, or senior year. Academic courses that fulfill the course component of the experiential education requirement are listed and described in the *Guide to the College of Arts and Sciences Experiential Education Requirement* booklet, which is available in the Office of the Dean, 400 Meserve Hall. This guide gives more specific information about the requirement and informs students about how to plan for it. Academic departments and program offices also have information specific to the requirement for the majors that they offer, and every major has an experiential education adviser available to students who have questions about the requirement or need advice on how to fulfill it. These advisers are also listed in the guide.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language or American Sign Language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be fulfilled in the full-time day programs at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program should complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332, Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a video production requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

Required courses. INT 1320, Exploring the Humanities through Film, or LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1171, Animation Workshop;

ART 1180, Video Basics; or CMN 1450, Television Studio Production. ***Choose five electives:*** AFR 1133, History of Blacks in the Media and the Press; ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; CMN 1451, Foundations of Broadcast Technology; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); CMN 1620, Television Criticism; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNF 1521, French Film and Culture; LNF 1560, Film and Psychoanalysis; LNG 1554, Modern German Film and Literature; LNR 1550, History of Soviet Cinema; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (21 Dockser), at 617-373-5163.

Minor in International Affairs

The minor in International Affairs provides students with the opportunity to develop a greater awareness and understanding of both regional and global issues. It seeks to better prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international coop, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

Elective categories. A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category.

Regional Analysis. Students must select two or three courses from this category and these courses must be chosen from at least two different regional subcategories.

Africa: AFR 1197, Modern African Civilization†; AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization†; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization†; AFR 1342/POL 1342, Crisis and Conflict in Black Africa†; AFR 1403/HST 1623, History of West Africa†; and AFR 1405/ HST 1625, South African History.†

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History†; HST 1633, Modern China†; HST 1634, Contemporary China; HST 1637, Modern Japan†; MUS 1183, Music of East Asia†; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions†; PHL 1293, Eastern and Nontraditional Philosophy; POL 1332, Government and Politics of Japan†; POL 1371, Government and Politics of China†; SOC 1104, Sociology of Japan.†

Europe: ART 1204, Renaissance Architecture†; ART 1205, Renaissance Art†; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe†; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society†; LNG 1554, Modern German Film and Literature†; LNS 1550, Spanish Civil War in Spanish Film†; POL 1306, Politics in Western Europe†; POL 1340, Crisis and Change in Central/Eastern Europe†; POL 1343, Politics and Violence in Northern Ireland†; POL 1347, Russian Politics After Communism†; SOC 1105, Society and Culture in Russia and the Former Soviet Union.†

†This course is expected to be offered annually.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America†; HST 1605, The Modern Caribbean†; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture†; LNS 1511, Introduction to Caribbean Literature†; MUS 1184, Music of South America, Latin America, and the Caribbean†; POL 1368, Government and Politics of Latin America†; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East†; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East†; POL 1346, Gender in the Middle East.†

Global Dynamics and Development. Students must choose at least two courses from this category:

AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1190/IAF 1190, The Global Economy; ECN 1330, Development Economics†; ECN 1335, International Economics: Finance†; ECN 1336, International Economics: Trade†; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business†; INB 1731, Cultural Aspects of International Business†; INB 1735, Import and Export Management†; PHL 1130, Ethics East and West†; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam†; POL 1112, Introduction to International Relations†; POL 1113, Introduction to Foreign Governments†; POL 1309, International Political Economy†; POL 1313, International Organization†; POL 1337, U.S. Foreign Policy†; POL 1338, Religion and Politics; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict†; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1104, Cultures of the World†; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOA 1430, Latin American Society and Development†; SOC 1171, Race and Ethnic Relations: A World Perspective.

Minor in Jewish Studies

The minor in Jewish studies provides students the opportunity to undertake the study of Jewish religion, culture, and history at Northeastern or in combination with courses at Hebrew College in Brookline, Massachusetts, and courses under the study abroad program. Students take seven courses. A minimum of four courses must be taken at Northeastern.

All students must take PHL 1285, Introduction to Jewish Religion and Culture, and a senior-level directed study or seminar that involves a major research project.

Additional courses at Northeastern. HST 1539, American Jewish History; POL 1384, The Arab-Israeli Conflict; PHL 1315, Understanding the Bible; ENG 1558, Jewish Themes in Literature (Literature in Context); MUS 1185, Music of the Jewish People; SOC 1350, Jewish Women in U.S. Culture; and up to two of the following courses: ED 1423, Ethnic and Multicultural Education; PHL 1110, Introduction to Religion, or SOC 1470, Sociology of Religion; SOC 1140, The Sociology of Prejudice.

Students may petition the Jewish studies coordinator to gain Jewish studies credit for any courses not on this list for which they do substantial work in Jewish studies.

Courses at Hebrew College. Students take courses approved by the coordinator of Jewish studies at Northeastern. Students should contact the University registrar, Dean Edmund Mullen, for more information about enrolling at Hebrew College.

Study abroad. Students take courses at Hebrew University, Tel Aviv University, or Ben Gurion University under the study abroad program. Courses must be approved by the coordinator of Jewish studies at Northeastern.

For more information contact the Jewish studies coordinator, Professor James Ross, at 617-373-4050.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary program drawn from six academic departments (African-American Studies, History, Music, Political Science, Modern Languages, and Sociology/Anthropology). Latin American Studies combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Latin American society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study abroad programs. It is strongly recommended that students pursuing the minor achieve proficiency in Spanish. Students take six required courses and either complete an internship or co-op

†This course is expected to be offered annually.

experience in a community-based agency or participate in a study abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

History: AFR/HST 1196, The Black Experience in the Caribbean; HST 1538, History of Latinos(-as) in the U.S.; HST 1604, Latin America: The Modern Period; HST 1605, Introduction to Caribbean History; HST ____, U.S. History from a Latino Perspective.

Humanities, language, and literature: LNS 1315, Latin American Literature (Colonial, 19th Century); LNS 1316, Latin American Literature (20th Century); LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and new courses added in this area.

Social science: POL 1368, Government and Politics of Latin America; SOA/INT 1133, The Americas from an Indigenous Perspective; SOA 1430, Latin American Society and Development; SOC 1221, The Sociology of Latino Migration; SOC 1460, Sociology of Latino Society; and new courses added in this area.

Comparative Studies (courses that include components of Latino, Latin American and Caribbean societies and compare them to other societies): AFR 1151, African-American Art History; AFR 1155, Foundations of Black Culture; AFR 1294, Third World Political Relations; POL 1316, Contemporary Revolutionary Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture; THE 1847, Images of Afra-American and Latina Women in Film; and new courses added in this area.

Minor in Linguistics Curriculum

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, Sociology/Anthropology) collaborate to offer the Minor in Linguistics. Courses are cross-listed and can be taken under either prefix.

LIN 1118, Introduction to Language and Linguistics 1; LIN 1218, Introduction to Language and Linguistics 2; one of the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1402, Grammars of English; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499/PSY 1499, Psychology of Reading; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

For more information, contact Professor Janet Randall, 617-373-3678, or the Linguistics Program Office in 563 Holmes Hall, 617-373-4553.

Minor in Marine Studies Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617-373-3176.

Minor in Media Studies Curriculum

The media studies minor is intended for students who seek an intense education in the field of mass communication through an exposure to coursework in a number of academic disciplines. Coursework includes theory, criticism, and projection. The minor may be taken as a complement to a major in any department or college at the University. Individual programs may be developed with the approval of the chair of the Department of Communication Studies or the director of the School of Journalism. Consult your adviser to determine the course of study most appropriate for your educational goals. Students must complete four courses from the following list to fulfill the minor: CMN 1250, Introduction to Mass Communication; CMN 1450, Television Production*; CMN 1451, Foundations of Broadcast Technology*; HST 1575, History of Media in America; JRN 1512, Journalism Ethics and Issues. In addition, students must complete four other courses, including one course from each area of the following: ***technical/production:*** ART 1281, Video Basics; CMN 1452, Radio Production*; CMN 1455, Television Field Production; JRN 1421, Television Newswriting; JRN 1422, Television News Production; ***management:*** CMN 1453, Broadcast Management*; CMN 1454, Programming for Radio and Television*; JRN 1508, Law of the Press; ***criticism:*** CMN 1317, The Audience in Mass Communication*; CMN 1620, Television Criticism*; HST 1494, History and Film; INT 1320, Exploring the Humanities through Film. Special Topics courses may apply to the minor when the topics are focused on media. They may be used to fulfill any of the above elective areas. For further information about the program, contact Professor Nicholas Daniloff, 102 Lake Hall, or Dr. Richard Katula, 145 Meserve Hall.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 *or* ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing *or* ENG 1380, Writing for the Professions: Health Services *or* ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking *or* CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101 Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1226, Modern Architecture: The Twentieth Century; ART 1150, Architectural Design 1.

African-American studies: AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor John Portz, political science, 303 Meserve Hall, 617-373-2796; Professor George Thrush, art and architecture, 309 Ryder Hall, 617-373-2083; Professor Gregory Wassall, economics, 317 Lake Hall, 617-373-2196.

Minor in Women's Studies Curriculum

The Women's Studies program offers students an opportunity to work with respected scholars in a variety of disciplines to examine the human experience through the perspectives of women. This interdisciplinary program examines the importance of gender in societies around the world, past and present. The curriculum encourages students to learn and think about how changing beliefs about women and men have affected research and scholarship in the arts, humanities, and social and natural sciences. Students learn about gender stereotypes, the various ways ideas about gender and sexuality have developed, and the changing situation for women and men today. Key questions are posed that change how people see the world: How does gender influence the kinds of questions we can ask of the world around us? What information can become data when you use gender as a central part of examining a problem? The Women's Studies program coordinates the Boston Area Colloquium on

*Some courses require prerequisite courses or permission of instructor.

Feminist Theory lecture series, sponsors talks by scholars on campus, produces the Working Papers in Gender Studies Series, and sponsors the Visiting Research Scholars in Women's Studies series. Women's Studies also works closely with the independent, student-run Women's Center to sponsor programs for Women's History Month and other events of special concern to women students.

To minor in Women's Studies, students take a total of seven courses: SOC 1150 *or* INT 1150, Introduction to Women's Studies; SOC 1302 *or* INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; AFR 1121, African American Literature 1; AFR 1133, History of Blacks in the Media and the Press; AFR 1251, Survey of Black Drama; AFR 1442, African American Women; CJ 1616, Women and the Criminal Justice System; CMN 1232, Gender and Communication; CRS 1503, Human Sexuality and Family Dynamics; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature (when gender related); ENG 1602, Major Figure (when gender related); ENG 1678, Early African American Literature; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1306, Spanish Golden Age Theatre; LNS 1500, Backgrounds of Spanish Culture; LNS 1510, Saints and Sinners; MUS 1106, Women, Gender, and Music; MUS 1800, Directed Study (when gender related); NUR 1303, Life Crisis: Analysis and Response; NUR 1606, Women's Health Choices; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1327, Gender Politics; POL 1328, Women in Public Management; POL 1346, Gender and Politics in the Middle East; PSY 1218, Psychology of Women; PSY 1251, Food, Behavior, and Eating Disorders; SOA 1100, Peoples and Cultures; SOA 1146, Rural Workers in the Third World; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOA 1430, Latin American Society and Development; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; SOC 1217, Women, Health, and Social Change; and SOC 1350, Jewish Women in U.S. Culture. New courses are being developed.

Undergraduate students who want to integrate their interest in women's studies with a major discipline can consult with the Women's Studies coordinator to develop an interdisciplinary major. Plans are underway for a dual major.

Graduate students interested in women's studies should note that, pending approval, a non-degree Graduate Certificate in Women's Studies may be available soon. Currently, graduate students in the sociology and anthropology department can develop a specialization in gender. A range of departments and colleges offer graduate courses in gender.

Graduate elective courses. CJ 3515, Gender and Justice: Women, Crime, and the Law; CRS 3356, Seminar in Feminist Theory; CRS 3384, Human Sexuality; ENG 3315, Contemporary Critical Theory; ENG 3317, Topics in Criticism: Feminist Literary Theory; ENG 3333, Major Figures in African American Literature; Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3361, European Women's History; HST 3370, Seminar in History of the Family; HST 3398, Seminar in Feminist Theory and Historical Inquiry; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; SOA 3102, Class and State Formation; SOA 3103, Gender, Sexuality, and Culture; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3302, Feminist Methodologies; SOC 3304, Feminist Theory; SOC 3319, Contemporary Religious Identity: A Feminist Focus; SOC 3365, Social Movements; SOC 3412, Contemporary Issues in Sociology when gender oriented; and NUR 1606, Women's Health: Choices and Decision. New courses are being developed and added.

Matriculated graduate students can also take courses through Northeastern's affiliated Graduate Consortium in Women's Studies at Radcliffe College. Team-taught courses offered regularly include Feminist Perspectives in Research; Gender, Sexuality, and Culture in Latin American and U.S. Latino/a Society; Telling Lives; Genre and Gender in Women's Life Narratives; and Narratives of Gender and Kinship in Industrializing Societies. Students should apply through the Consortium and can pick up application forms at the Women's Studies Office, 524 Holmes Hall. Consortium courses involve no additional tuition.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Ms. Audrey Aduama at 617-373-4984.

Special Programs

Additional information is available from involved departments and the Office of the Dean, 400 Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Independent Major

An eligible student may propose an independent major to the College Curriculum Committee. Information concerning eligibility, procedures, and requirements for independent majors is available in the Office of the Dean. Students interested in proposing an independent major should meet with an adviser from the Office of the Dean before beginning this process. The adviser will help the student locate faculty who may be interested in helping the student with the proposal, as well as a faculty member who may be interested in serving as one of the student's faculty advisers. No student may be considered for an independent major until an independent major proposal has been approved by the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

Bachelor of Arts or Bachelor of Science/ Juris Doctor Degree Program

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

Bachelor of Arts or Bachelor of Science/ Master of Business Administration Program

A limited number of students may combine an initial period of undergraduate study in the College of Arts and Sciences with graduate study in the College of Business Administration, enabling students to earn both the Bachelor of Arts or Bachelor of Science and the Master of Business Administration degrees including one year of co-op work experience (six months undergraduate and six months graduate) in a five- or six-year period.

In the first three years, students complete nine academic quarters of arts and sciences courses with two quarters of cooperative education. After taking the GMAT and being accepted into the College of Business Administration in the third year, students spend their fourth year completing requirements in their undergraduate major and beginning graduate coursework in the Cooperative Education MBA Program. Depending on the undergraduate major, twelve credits of undergraduate study may be applied toward the MBA or twelve credits of MBA study may be applied toward the bachelor's degree. Students may begin the Cooperative education MBA portion of study in January or June.

Interested students should contact the College of Arts and Sciences dean's office in 400 Meserve Hall or the College of Business Administration's graduate school in 350 Dodge Hall.

Northeastern University–Hebrew College Exchange

This program offers students the opportunity to register for courses in specialized areas of Jewish studies and Jewish education. See page 36, Minor in Jewish Studies, or contact the University registrar, Dean Edmund Mullen, 120 Hayden Hall, 617-373-2183, for more information on the registration process for this exchange program.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-373-2234.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Students use role-playing extensively and practice "intake" interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student wishing co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-373-3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall at the University of Washington's Friday Harbor Laboratories, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The final phase of the program is conducted at

Northeastern's Marine Science Center in Nahant, Massachusetts. For more information, contact Sara Jordan at 617-595-5597.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617-373-4380.

Sea Education Association. The Sea Semester offers a combination land-sea program in marine science, maritime navigation and history, and practical seamanship with deep-water oceanographic research. A six-week sea voyage, often to the Caribbean or the Canadian Maritimes, provides hands-on experience.

The Center for the Arts

The primary mission of the Center for the Arts is to support and develop the arts as a vital and integral component of the Northeastern community. Through a variety of mainstage and artist-in-residency programs, featuring performing and visual artists acclaimed for their excellence, the center complements the academic arts departments in their effort to educate Northeastern students in becoming knowledgeable, discriminating, and active participants in the arts. In addition, the center supports curriculum-oriented arts projects and events, encourages interdepartmental collaborations, develops exhibitions and presentations that serve the on-campus community as well as the general public, provides multicultural arts programs, and acts as a primary facilitator for research in the arts.

The center also manages the Blackman Auditorium Theatre Complex and operates the Northeastern University Ticket Center. Tickets to and information about performing and visual arts events and other campus events are available in the ticket center as are tickets and passes to Boston area dance, music, theatre, film, and visual arts events. The ticket center also provides free passes and maintains a University membership to the Museum of Fine Arts that entitles all undergraduate students in the full-time day programs to free membership privileges.

For information on arts activities, please call the Center for the Arts office at 617-373-2249. For ticket information, call the ticket center at 617-373-2247.

Study Abroad

The College of Arts and Sciences strongly endorses the importance of an international experience as a dimension of learning. To foster this, it maintains an Office of International Study Programs that has developed a series of programs tailored to the interests and needs of Northeastern University students.

Students who wish to pursue a particular program sponsored by Northeastern University or another institution should arrange to discuss the program in which they are interested with the Coordinator of International Study Programs, 400 Meserve, (617) 373-5162, and with one of the academic advisers in the Dean's Office to ensure that credits granted through study abroad will be applicable to their program in the college. Students who participate in Northeastern-sponsored study abroad programs maintain their full-time Northeastern status, and their grades will be calculated into their QPA.

The general requirements for participation in all Northeastern University study abroad programs are: middler-year standing or above, and QPA of 3.0 or higher. The Office of International Study Programs maintains a rolling admission policy for most programs; early application is advised.

African Studies at the University of Ghana. Recommended for the fall quarter, this program offers students an opportunity to learn about West African history, politics, music, literature, and culture. Students are required to take a Twi language course and a Ghanaian or African studies course.

Australia. Students may choose to study in one of four universities located across the continent: Curtin University in Perth; the University of Sydney; Monash University in Melbourne; or Bond University on the Gold Coast. All of the locations offer similar courses in a variety of arts and sciences disciplines. The opportunity to live and study with Australian students exists at all four universities; however, each university offers uniquely different opportunities based on its location.

Eastern European Studies Program in Prague. This program offers students a variety of courses in the arts and sciences at Charles University. The primary focus will be on the history, politics, literature, and culture of the Czech Republic. Courses are taught in English, but all students will receive intensive instruction in the Czech language as well. This program is recommended for the fall quarter.

European Studies Internship Program. This program takes place during the winter quarter at the Irish Institute for European Affairs in Leuven, Belgium, near Brussels, and has been designed to offer students an opportunity to learn about the history, organization, and operation of the European Union. Courses are available in politics, economics, history, and other subjects. Included is participation in a research internship with the office of a member of the European Parliament.

Florence, Italy. The SACI program, located in the heart of Florence, is designed for students to study art, art history, photography, Italian literature, Italian language, and a variety of other arts and sciences disciplines. Courses taught in English are available in both introductory and advanced levels. This program is recommended for the fall quarter.

Goldsmiths' College, University of London. A wide variety of courses in art, communications, theatre, education, English, history, politics, psychology, and sociology are available to Northeastern University students through a special arrangement with the University of London. Students may participate during the fall and/or winter quarters.

Hansard Scholars Parliamentary Internship Program in London. Available during the fall or winter quarter, this program combines courses in British society and government with carefully selected internship placements, including the British Parliament. Courses are taught at the London School of Economics and Political Science

Hungarian and Central European Studies in Budapest. Recommended for the fall quarter, this program allows students to see firsthand the dramatic changes occurring in Eastern Europe. The courses (taught in English) are offered mostly in the arts and sciences, but there are a variety of disciplines to choose from. The main focus is on economics, literature, history, and sociology. While taking classes at the Technical University of Budapest, students will also be encouraged to take an intensive Hungarian language class.

Ireland: North and South Internship Program. Students in this program spend two quarters in Ireland: fall at the Institute of Public Administration in Dublin, and winter at Queen's University in Belfast. Courses are available in literature, sociology, political science, history, and other subjects. The fall quarter includes an internship in the Irish Parliament; the winter quarter includes a short-term internship in Belfast.

Middle Eastern Studies. In a full-year (September through May) or partial-year program, students spend the autumn term at the American University in Cairo and the winter/spring term at Tel Aviv University in Israel. A wide variety of arts and sciences courses (taught in English) are available. Courses with a Middle Eastern focus are recommended. Students are also encouraged to take an intensive Arabic and an intensive Hebrew language course while overseas.

North American Studies in Mexico. Conducted during the fall quarter at the University of the Americas in Puebla, this program addresses North American political and social issues from a Mexican perspective. The general focus is on social sciences; courses (taught in English) are available in economics, politics, and sociology. Spanish language classes (all levels) are available. Students may also enroll in other arts and sciences courses that are taught in Spanish.

Paris, France: American University of Paris. This new program offers an opportunity to live and study in the heart of Paris. Courses are taught in English and are available in most arts and sciences disciplines. Students may spend the summer and/or fall quarter at AUP. Students are also encouraged to take an intensive French language course while in Paris.

Russian Studies. Recommended for the fall term, this program offers students an opportunity to focus on the cultures and languages of Russia. Students in this program choose the location of their study from a variety of host cities. Included are extracurricular field trips within Russia. Courses are taught in Russian with English textbooks. Basic knowledge of Russian language is required.

Sea Education Association. The Sea Semester offers a combination land-sea program in marine science, maritime navigation and history, and practical seamanship with deep-water oceanographic research. A six-week sea voyage, often to the Caribbean or the Canadian Maritimes, provides hands-on experience.

Simon Faser University in Vancouver. This program, available during the fall or winter/spring term, offers students an opportunity to gain knowledge of the politics, governments, geographies, economies, and cultures of Canada and the Pacific Rim. Courses are available in all arts and sciences disciplines.

Spain: Language and Area Studies. This program offers students an opportunity to live and study in their choice of one of two historic and beautiful Spanish cities: Seville or Alicante. Alicante offers courses taught in English to students with a basic knowledge of Spanish. Students live with

Spanish host families. Seville offers courses taught exclusively in Spanish to students with an advanced knowledge of the language. Students may chose to live with host families or in residencias (residential halls). Students may go in the fall quarter or for a full year.

The Office of International Study Programs is involved in the process of developing further programs and welcomes inquiries and indications of students' needs and interests. Please contact Todd Rich in the Office of International Study Programs, 400 Meserve Hall, 617-373-5162, for an updated list.

African-American Studies

Ronald W. Bailey, PhD, *Professor and Acting Chair*

Associate Professors
Jordan Gebre-Medhin, PhD
Anthropology
Maryemma Graham, PhD
Literature
Robert L. Hall, PhD
History
William Lowe, MA
Music
Joseph D. Warren, PhD
Social Welfare

Assistant Professors
Leonard Brown, PhD
Music
Robin Chandler, PhD
Sociology and Art
Elizabeth B. Cole, PhD
Psychology
Elizabeth H. Freydberg, PhD
Theatre
Kwamina Panford, PhD
Law, Policy, and Society

Associated Faculty
Oscar Brookins, PhD
Economics
Edward A. Bullins, MFA
Theatre
Donald M. Jacobs, PhD
History
Patrick Manning, PhD
History
William F. Miles, PhD
Political Science
Peter C. Murrell, PhD
Education

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the field of African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns. Plans for a study abroad program are under way.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies.

Beginning in 1997, the department will emphasize dual majors in African-American Studies and a range of other arts and sciences departments.

Bachelor of Arts and Bachelor of Science Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; one course on the Black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses which will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the Black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

American Sign Language–English Interpreting

Dennis R. Cokely, PhD, *Associate Professor and Director*

Teaching Staff
Alma L. Bournazian, MS
James Lipsky, BS

American Sign Language (ASL) is a language used by large numbers of people in the United States and Canada. By mastering ASL, students gain both access to the culture of Deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to recent federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England.

Bachelor of Science Curriculum

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL-English Interpreting 1, 2, and 3; ASL 1520, Interpreter Role and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, Interpreting Practicum 1; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and CMN 1110, Voice and Articulation.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: CRS 1200, Introduction to Special Education; ED 1302, The Human Services Professions; SOC 1240, Sociology of Human Service Organizations.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 33).

Art and Architecture

Elizabeth C. Cromley, PhD, *Professor and Chair*

Professor
Mardges Bacon, PhD

Associate Professors
Edwin C. Andrews, MFA
Samuel S. Bishop, MFA
Mira Cantor, MFA
T. Neal Rantoul, MFA
George H. Thrush, MArch

Assistant Professor
Julie M. Curtis, MFA

Lecturers
Cynthia L. Baron, MBA
Judith Brassard Brown, MFA
David A. Conant, MArch
E. Margaret Curley-Clay, MFA
Katheryn M. Firth, MAUD
Elizabeth A. Gibb, MArch
Cecilia Hirsh, MFA
Jeffrey T. Kalin, MPhil
John Kane, BA
Colleen M. Kiely, MFA
Douglas K. Kornfeld, MFA
Wallace F. Marosek, MFA
Mark E. Pasnik, MAUD
Thomas J. Petit, MFA
Neil Rennie, MFA
H. Mark Schatz, MArch
Ira L. Smith, MArch
Nader Tehrani, MAUD
Lawrence C. Volk, MFA

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, graphic design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Bachelor of Arts and Bachelor of Science Curriculum

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in architecture. Leading to a BS degree that is not a professional degree in architecture. The twelve art electives are replaced by four architectural history courses (ART 111, Introduction to Architecture; ART 1203, Medieval Architecture *or* ART 1204, Renaissance Architecture; ART 1225, Modern Architecture 1 *or* ART 1223, American Architecture; and ART 1226, Modern Architecture 2.

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1341, 1342, Architectural Design 1 to 6; and ART 1352, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in graphic design. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Art; ART 1230, History of Photography *or* ART 1237, Contemporary Directions in Cinema; ART 1240, History of Graphic Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; ART 1330, Advanced Visual Communication; and two Art/Design electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

General minor. Select any six courses from the departmental curriculum.

Minor in history of architecture. ART 1203, Medieval Architecture; ART 1204, Renaissance Architecture; ART 1223, American Architecture; ART 1225, Modern Architecture: The Nineteenth Century; ART 1226, Modern Architecture: The Twentieth Century; and ART 1310, Seminar in Modern Architecture.

Minor in architecture. ART 1111, Introduction to World Architecture; ART 1124, Basic Drawing *or* ART 1156, Architectural Drafting; *or* GE 1130, Engineering Design and Graphics; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; *or* ART 1295, Computer Aided Design; *or* ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; Art 1133, Graphic Design 1; and ART 1254, Intermediate Drawing.

Minor in graphic design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

Behavioral Neuroscience

The behavioral neuroscience major is a unit of academic coordination for undergraduates. It does not have faculty appointments or separate space, but does have a head advisor/director and an advisory board made up of the neuroscience faculty of the College of Arts and Sciences. The overall objective of the neuroscience major program is to draw together faculty and students who are interested in this interdisciplinary topic to provide undergraduates with an education in the field. Behavioral neuroscience focuses on brain mechanisms and how they give rise to behavioral functions in humans and animals. The field combines the disciplines of biology and psychology with a strong background in basic physical sciences and mathematics. The goal is to achieve an understanding of nerve cells, chemical neurotransmission, simple neural circuits and other physiological systems and then to see how they give rise to normal and pathological behavioral functioning. Studies range from the molecular to the molar as seen in the example of a drug which interacts with specific protein molecules or receptors in nerve cell membranes but also can be used to alter behavior. The curriculum prepares students to find employment in allied fields such as the bio-tech industry or to gain entrance to higher degree granting programs in graduate or medical school. For further information on the behavioral neuroscience major, contact Alexander A. Skavenski, director and professor of psychology, at 617-373-3043.

Bachelor of Science Curriculum

Psychology: PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211, Behavioral Statistics 1; PSY 1212, Behavioral Statistics 2; PSY 1351, Psychobiology; PSY 1451, Psychopharmacology; PSY 1551, Psychobiology Laboratory.

One course from the following: PSY 1241, Developmental Psychology; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1.

Two courses from the following: PSY 1231, Learning and Motivation 1; PSY 1262, Psychology of Language; PSY 1353, Animal Behavior; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1381, Sensation; PSY 1382, Perception.

Biology: BIO 1100, Principles of Biology 1; BIO 1600, Principles of Biology 1 Lab; BIO 1101, Principles of Biology 2; BIO 1601, Principles of Biology 2 Lab; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; BIO 1355, Regulatory Cell Physiology; BIO 1655, Regulatory Cell Physiology Lab.

Two Biology courses from the following: BIO 1321, Evolution; BIO 1621, Evolution Lab; BIO 1343, Vertebrate Zoology; BIO 1641, Vertebrate Zoology Lab; BIO 1346, Embryology; BIO 1646, Embryology Lab; BIO 1349, Animal Histology; BIO 1648, Animal Histology Lab; BIO 1356, Comparative Vertebrate Anatomy; BIO 1656 Comparative Vertebrate Anatomy Lab; BIO 1452, Comparative Neurobiology; BIO 1473, Systems Physiology; BIO 1677, Systems Physiology Lab; BIO 1474, Neuroethology; BIO 1674, Neuroethology Lab; BIO 1462, General Biochemistry Laboratory; BIO 1463, General Biochemistry 3; BIO 1467, Molecular Biology.

Mathematics and Chemistry: MTH 1106, Functions and Algebra and MTH 1107, Functions and Calculus and MTH 1108, Calculus; *or* MTH 1133, 1134, and 1135, Calculus for Biology Majors 1, 2, and 3; CHM 1111, General Chemistry for the Life Sciences 1; CHM 1112, General Chemistry for the Life Sciences 2A; CHM 1122, General Chemistry for the Life Sciences 2B; CHM 1264, Organic Chemistry for Biology Science Majors 1; CHM 1265, Organic Chemistry for Biology Science Majors 2.

Seminar: PSY 1651, Psychobiology *or* BIO 1490, Seminar in Biology.

BS Core Curriculum: For Natural Science majors, but excluding PSY 1110, PSY 1113, Perspectives in Psychology 1.

Electives: Select ten courses. Recommended courses include: PHY 1201, PHY 1202, and PHY 1203, Physics for the Life Sciences 1, 2, and 3; and two Directed Study courses toward a Senior Honors Project or equivalent.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Science Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1461, General Biochemistry 1; BIO 1462, General Biochemistry Lab; BIO 1463, Cellular Biochemistry 3; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1122, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3; *or* CHM 1264, CHM 1265, Organic Chemistry for Biology Science Majors 1 and 2; CHM 1273, Organic Chemistry for Chemistry Majors 3; and CHM 1381, CHM 1382, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus for Science Majors 1, 2, and 3 *or* MTH 1133, MTH 1134, MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Majors 1, 2, and 3; two quarters of corresponding physics lab courses; four advanced biology and chemistry electives (minimum of one from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 33).

Biology

Edward L. Jarroll, PhD, *Professor and Chair*

Professors
H. William Detrich, PhD
Gwilym S. Jones, PhD
James M. Manning, PhD
Richard L. Marsh, PhD
Charles A. M. Meszoely, PhD
M. Patricia Morse, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD
Phyllis R. Strauss, PhD
Carol M. Warner, PhD
David C. Wharton, PhD

Associate Professors
Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Frederick C. Davis, PhD
Charles H. Ellis, Jr., PhD
Helen H. Lambert, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD
Wendy A. Smith, PhD

Assistant Professor
L. David Smith, PhD

Professors Emeriti
Francis D. Crisley, PhD
Charles Gainor, PhD
Nathan W. Riser, PhD

Adjunct Professors
Bruce B. Collette, PhD
Sergei Kashin, PhD

Adjunct Assistant Professor
Slava S. Epstein, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology/microbiology, molecular biology, plant biology, zoology, etc. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middler year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical or predental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Arts Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1211, Environmental and Population Biology; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Fundamentals of Mathematics, MTH 1107, Functions and Basic Calculus, *or* Calculus (one year); PHY 1201 and PHY 1202, *or* PHY 1203, Physics for the Life Sciences 1 and 2, *or* 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science

and Engineering Students 1 and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1211, Environmental and Population Biology; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; and four advanced biology electives approved by department Advisory Committee.

Calculus (one year); PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 *or* PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor advisor before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 373-2260.

Chemistry

William M. Reiff, PhD, *Professor and Chair*

Professors
Terry K. Baker, DSC
Geoffrey Davies, DSC
David A. Forsyth, PhD
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
John L. Roebber, PhD
Alfred Viola, PhD
Paul Vouros, PhD
Philip M. Warner, PhD

Associate Professors
Thomas R. Gilbert, PhD
David J. Jebaratnam, PhD
Alex K-Y Jen, PhD
Rein U. Kirss, PhD
Ira S. Krull, PhD
Patricia A. Mabrouk, PhD
Nelly M. Rodriguez, PhD

Assistant Professors
David E. Budil, PhD
Lutfur R. Khundkar, PhD

Laboratory Coordinator
Edward H. Witten, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their course work into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas which have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

The Department of Chemistry offers two degree programs. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

The Department of Chemistry also offers a Bachelor of Science with an Interdisciplinary Option. In this program some of the courses required for a traditional BS in chemistry have been replaced with required and elective courses focused on one of several disciplines, including business administration, education, environmental science, and law and public policy. The options are offered because chemists frequently take jobs that require knowledge and skills not provided by the traditional chemistry major program. The options programs add breadth to the curriculum for chemistry majors while still providing a technical core of math, physics, and chemistry courses. More information about these options are contained in the pamphlet *Options for Chemistry Majors* available from the Chemistry Department.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 *or* MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab. CHM 1441, Advanced Inorganic Chemistry; CHM 1451, Experimental Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

Bachelor of Science with an Interdisciplinary Option

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; MTH 1133, MTH 1134, MTH 1135, Calculus 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics 1, 2, and 3; PHY 1501, PHY 1502, PHY 1503, Physics Lab 1, 2, and 3; and two math or science electives and the required and elective courses in the interdisciplinary area.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; or CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

Richard A. Katula, PhD, *Professor and Chair*

Associate Professors
Karen S. Buzzard, PhD
Carl W. Eastman, MA
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professor
Simon Jones, PhD

Instructors
Thomas Shaker, MA
Sherry Shepler, MA

Communication studies offers students a humanities-based, liberal arts education coupled with pre-professional training.

Students who major in communication studies learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

Bachelor of Arts and Bachelor of Science Curriculum

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1300, Communication Theory; CMN 1330, Interpersonal Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three adviser-approved communication studies courses are required to complete the major.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; CMN 1500, Special Topics in Communication Studies; and CMN 1554, Special Topics in Media.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1430, Organizational Communication; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1554, Special Topics in Media; and CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315 Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1430, Organizational Communication; CMN 1450, Television Studio Production; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1500, Special Topics in Communication Studies; and CMN 1554, Special Topics in Media.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism. Individual programs may be approved through the Communication Studies Department.

Economics

John Adams, PhD, *Professor and Chair*

Professors
M. Shahid Alam, PhD
Barbara M. Fraumeni, PhD
Harold M. Goldstein, PhD
Irwin L. Herrnstadt, PhD
Sungwoo Kim, PhD
Steven A. Morrison, PhD
Gustav Schachter, PhD
Andrew M. Sum, MA

Associate Professors
Neil O. Alper, PhD
Oscar T. Brookins, PhD
Kamran N. Dadkhah, PhD
Alan W. Dyer, PhD
Gregory Wassall, PhD

Assistant Professor
Katherine A. Kiel, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and identify policies that contribute to economic stability and progress.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the Third World and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services.

Bachelor of Arts Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1220, History of Economic Thought; ECN 1250, Statistics; and eight other economics courses, of which at least six must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In order to graduate with a BA in economics, a student must earn an average grade of C (QPA=2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1220.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1250, Statistics; ECN 1260, Problems in Economic Research; and twelve other economics courses, of which at least nine must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In order to graduate with a BS in economics, a student must earn an average grade of C (QPA=2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1260.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and six other courses in economics, of which at least two must be upper-level (non-Pathway) electives and one must be ECN 1250, Statistics, or equivalent (unless a comparable course is required by the major department). Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

Susan L. Melnick, PhD, *Associate Professor and Chair*

Professors
Maurice Kaufman, PhD
Mervin D. Lynch, PhD
Sandra M. Parker, EdD

Associate Professors
Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
Joseph Meier, EdD
Peter C. Murrell, PhD
Irene A. Nichols, EdD
Barbara A. Schram, EdD

Assistant Professors
Thomas H. Clark, MA
Terry L. Haywoode, PhD

Professor Emeritus
John D. Herzog, PhD

The Department of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain advanced provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department.

Early Childhood Education and Elementary Education

Students who wish to obtain certification as early childhood or elementary education teachers complete a major in the arts and sciences and enroll in a program of education courses. For specific education program course requirements, students should consult the *1997–1998 College of Arts and Sciences Guidebook.*

Secondary Education

Students seeking high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.

Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.

Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Adolescent Development, Learning, and Education; ED 1104, Learning and the Teaching Process; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Curriculum Development; and ED 1417, Student Teaching and Seminar.

Student Teaching

Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors
Samuel J. Bernstein, PhD
Robert J. Blanch, PhD
Francis C. Blessington, PhD
Irene Fairley, PhD
Wayne Franklin, PhD
Gary Goshgarian, PhD
Guy Rotella, PhD
Michael Ryan, PhD
Herbert L. Sussman, PhD
Arthur J. Weitzman, PhD
Joseph E. Westlund, PhD

Associate Professors
Maryemma Graham, PhD
Kathleen Kelly, PhD
Mary K. Loeffelholz, PhD
Janet Randall, PhD
Bonnie TuSmith, PhD
Susan Wall, PhD

Assistant Professors
Kathy Howlett, PhD
Marina Leslie, PhD
Barbara Rodriguez, PhD

Lecturers
Joseph B. deRoche, MFA
David W. Tutein, MA

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Literary Interpretation; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in creative writing. ENG 1351, Creative Writing; one course from the following: ENG 1356, Drama Workshop; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; ENG 1360, Topics in Writing; and must complete ENG 1362, Publication Arts.

Concentration in literature. One language or writing course from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; and three English electives.

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; ENG 1126, Backgrounds in English and American Literature *or* ENG 1307, Literary Interpretation; two English courses in literature at the 1200 level or above *or* one course in literature at the 1200 level or above and one linguistics course at any level; and one junior/senior seminar.

Minor in Writing Curriculum

Six courses required, five from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1125, Technical Writing 1; ENG 1350, Intermediate Writing; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Non-Fiction Workshop; ENG 1362, Publication Arts; ENG 1370, Technical Writing 2; ENG 1380, Writing for the Professions: Health Services; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; and one elective.

Minor in Linguistics Curriculum

See page 37.

Minor in Technical Communication Curriculum

See page 38.

Geology

Richard H. Bailey, PhD, *Professor and Chair*

Professors
Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors
Bernard L. Gordon, MS
Peter S. Rosen, PhD
Martin E. Ross, PhD

Assistant Professor
Patrick M. Colgan, PhD

Geology is an interdisciplinary science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require coursework in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, geology and land-use planning, environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, to the Grand Canyon, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the optional co-op plan typically work with local engineering, environmental consulting companies, or with government agencies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation.

Bachelor of Arts in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Geology Curriculum

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-use Planning; and five geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1100, BIO 1101, Principles of Biology 1 and 2; BIO 1600, BIO 1601, Principles of Biology 1 and 2 Labs; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 *or* BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Environmental Geology Curriculum

GEO 1212, Physical Geology *or* GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning or GEO 1442, Water in Environmental Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History

William M. Fowler, Jr., PhD, *Professor and Chair*

Professors
Ballard C. Campbell, PhD
Harvey Green, PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Clay McShane, PhD
Anthony N. Penna, DA
Raymond H. Robinson, PhD

Associate Professors
Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD
Christina Gilmartin, PhD

Assistant Professors
Gerald H. Herman, MA
Felix V. Matos Rodriguez, PhD

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers two degree programs: a Bachelor of Arts, for students preparing for graduate work in history or for teaching careers; and the Bachelor of Science, designed for students planning careers in public history fields or in the "new history" areas that require technical understanding of the social sciences.

All history majors are required to take courses in Western or world civilization, American history, and historical methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a seminar in Approaches to History, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to test themselves by doing an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through cooperative education placements, fieldwork, internships, and other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648; *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1102, Western Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors), and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1102, Western Civilization since 1648; HST 1201 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization since 1648 *or* HST 1122, World Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors).

Human Services

Wilfred E. Holton, PhD,
Director and Associate Professor, Sociology/Anthropology and Human Services

Advisory Committee
Susan Beaton, MA
Human Service Internship Supervisor
Margie Crooks, MA
Counseling Center
Patricia Fetter, PhD
Counseling Psychology, Rehabilitation, and Special Education
Terry Haywoode, PhD
Education/Human Services
Louise LaFontaine, EdD
Counseling Psychology, Rehabilitation, and Special Education
Richard A. Loverd, PhD
Political Science
Gordana Rabrenovic, PhD
Sociology/Anthropology
Barbara A. Schram, EdD
Education/Human Services
Martha Wengert, MEd
Cooperative Education
Harold S. Zamansky, PhD
Psychology

Professor Emeritus
John D. Herzog, PhD

Human Services is a behavioral sciences major that includes courses in psychology, sociology, education, political science, economics, counseling, and social sciences. Students take basic foundation courses, skills courses, and complete two intensive fieldwork internships in Boston agencies. The major may lead to careers in many diverse areas of the helping professions or to graduate programs in social work, counseling, rehabilitation, education, and law. Students who major in human services select specialization areas such as deaf studies, counseling, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, education, and more. Students prepare for positions in both public and private agencies including: casework in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, in the Fenway Project, which provides student volunteers to community agencies, and Alpha Delta Omega, the national honor society in Human Services. The major has an extensive academic counseling capacity and encourages students to undertake independent studies, work on grants, and pursue other special projects.

Bachelor of Arts Curriculum

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Human Services and Social Science; ED 1302/HS 1101, The Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324/HS 1260, Human Services Research and Evaluation; SOC 1240/HS 1240, Sociology of Human Service Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1309/HS 1219, Intervention Strategies for the Human Services; HS 1333, Senior Seminar in Human Services.

Internship. HS 1336 and HS 1337, Field Internship in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences bachelor of arts core curriculum (see page 33).

Bachelor of Science Curriculum

Prerequisite courses. Same as for the Bachelor of Arts curriculum.

Core courses. Same as for the Bachelor of Arts curriculum plus POL 1329, American Social Welfare Policy *or* SOC 1501, Social Policy and Social Intervention, or another social policy course.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization with human services, chosen with the student's academic adviser; ED 1107, Beginning Computer Use *or* COM 1105, Computer Science and Its Applications.

In addition, complete the arts and sciences bachelor of science core curriculum (see page 33), plus another mathematics or science course, or a health-related course.

Specialization in Deaf Studies

Prerequisite, core, and internship courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; *or* ASL 1401, American Sign Language Literature.

Major in Human Services Combined with Elementary Education Program

Students can now major in Human Services and prepare themselves as beginning teachers at the elementary level, meeting the new requirements in Massachusetts. This program gives students a strong background in psychology, sociology, human services, and other fields of study along with skills in teaching. See a Human Services adviser or the chair of the Department of Education for the requirements of the double major.

Minor in Human Services Curriculum

ED 1302, Human Services Professions; ED 1309, Intervention Strategies; HS 1336, Internship in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

International Affairs

Advisory Committee

John Adams, PhD
Economics
Timothy Donovan, PhD
Associate Dean, Arts and Sciences
Inez Hedges, PhD
Modern Languages
T. Anthony Jones, PhD
Sociology and Anthropology
Holbrook C. Robinson, PhD
Modern Languages
Denis J. Sullivan, PhD
Political Science

The major in international affairs (BA) provides students with the opportunity to develop a deep understanding of both regional and global issues. It is intended to prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students wishing to complete the major in international affairs will take seventeen courses; in addition, students must fulfill a Foreign Language Proficiency requirement, an International Experience requirement, and the BA Core Curriculum.

Bachelor of Arts Curriculum

Required courses. IAF 1100, Introduction to International Affairs; IAF 1104/SOA 1104, Cultures of the World; IAF 1112/POL 1112, Introduction to International Relations; IAF 1113/POL 1113, Introduction to Foreign Governments; IAF 1122/HST 1122, World Civilization since 1648; IAF 1300, International Conflict and Negotiation; IAF 1330/ECN 1330, Development Economics; *or* IAF 1190/ECN 1190, The Global Economy; IAF 1400, International Experience Workshop; and IAF 1500, Senior Seminar in International Affairs. Eight *elective courses* must be selected from those listed under the program's dual categories of *Regional Analysis* and *Global Dynamics and Development.* Students will take four courses from *Regional Analysis*, with at least three of these electives from within the same regional subcategory. Students will also take any four electives from *Global Dynamics and Development.*

Foreign Language Proficiency is defined as passing the Intermediate 2 level of a foreign language or meeting a comparable criterion approved by the Department of Modern Languages. (This requirement in the major also parallels the language requirement for the Bachelor of Arts degree in the College of Arts and Sciences.)

International Experience requires that students spend at least one term abroad. Students may fulfill this requirement by choosing at least one of three options: (a) study abroad, through enrollment in a Northeastern University study abroad program or (with prior approval) through another university; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop individually or which may be sponsored by a major department and/or a Northeastern University study abroad program; the internship may carry academic credit, with proper approval; (c) international co-op, which would be arranged through the Division of Cooperative Education.

Students must also satisfy requirements for the BA Core Curriculum. (The international affairs major is considered part of the social sciences.)

Elective categories. Students must select a total of eight courses from the dual elective categories of *Regional Analysis* and *Global Dynamics and Development.* Four courses must be chosen from each category. Students may choose any four courses from *Global Dynamics and Development.* Students must choose four courses from *Regional Analysis*, with at least three from the same subcategory.

Minor Curriculum

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international coop, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category. Students must select two or three courses from *Regional Analysis* and these courses must be chosen from at least two different regional subcategories.

I Regional Analysis. **Africa:** AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization; AFR 1342/POL 1342, Crisis and Conflict in Black Africa; AFR 1402/HST 1623, History of West Africa; AFR 1405/HST 1625, South African History;

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History; HST 1633, Modern China; HST 1634, Contemporary China; HST 1637, Modern Japan; MUS 1183, Music of East Asia; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions; PHL 1293, Eastern Philosophy; POL 1332, Government and Politics of Japan; POL 1371, Government and Politics of China; SOC 1104, Sociology of Japan;

Europe: ART 1204, Renaissance Architecture; ART 1205, Renaissance Art; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society; LNG 1554, Modern German Film and Literature; LNS 1500, Backgrounds of Spanish Culture; LNS 1550, Spanish Civil War in Spanish Film; POL 1306, Politics in Western Europe; POL 1340, Crisis and Change in Central/Eastern Europe; POL 1343, Politics and Violence in Northern Ireland; POL 1347, Russian Politics After Communism; SOC 1105, Society and Culture in Russia and the Former Soviet Union.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of South America, Latin America, and the Caribbean; POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East; POL 1346, Gender in the Middle East.

II Global Dynamics and Development. AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1190/IAF 1190, The Global Economy; ECN 1335, International Economics: Finance; ECN 1336, International Economics: Trade; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business; INB 1735, Import and Export Management; PHL 1130, Ethics: East and West; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam; POL 1309, International Political Economy; POL 1338, Religion and Politics; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOC 1171, Race and Ethnic Relations: A World Perspective.

Journalism

Nicholas Daniloff, MA, *Professor and Director*

Associate Professors
Charles F. Fountain, MS
William Kirtz, MS
James Ross, MS

Assistant Professors
Linda Conway Correll, MA
Laurel Leff, MA
Alan Schroeder, MPA

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Bachelor of Arts and Bachelor of Science Curriculum

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1105, Computer-Assisted Reporting; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Reporting; JRN 1440, Design and Graphics; a beat reporting class; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1423, Documentary Production; and one journalism elective.

Additional requirements. ENG 1110, ENG 1111, Freshman English 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one additional English or American literature elective; and one political science course. HST 1201, United States to 1877; HST 1202, United States since 1877; ECN 1115, Principles of Macroeconomics; and one business management course; MTH 1152, Statistical Thinking; one philosophy course; one history elective; and COP 1135, Professional Development for Journalists. MUS 1109, Introduction to Art, Drama, and Music.

Additional requirements for bachelor of arts. One course in science.

Additional requirements for bachelor of science. Two foreign language courses (at least up to Elementary II level) and four science or computer science courses. Two of the four science courses must be in biology, chemistry, and physics, and at least one of the science courses must be above the elementary level.

Students must also complete the arts and sciences core curriculum (see page 33).

Linguistics

Janet H. Randall, PhD, *Associate Professor and Coordinator of Linguistics Program*

Professors
Irene R. Fairley, PhD
English
Harlan Lane, PhD,
Doc. ès Lettres
Psychology
Joanne L. Miller, PhD
Psychology

Associate Professors
John N. Frampton, PhD
Mathematics
Michael R. Lipton, PhD
Philosophy and Religion
Lynn M. Stephen, PhD
Anthropology

Assistant Professors
Neal Pearlmutter, PhD
Psychology
Fei Xu, PhD
Psychology

Lecturer
Federika Busa, PhD
Computer Science

Linguistics—the science of language—focuses on such issues as how children learn to speak, how we understand and produce language, and how language ties people together. The field also explores how language is structured and represented in the mind, why some people are better than others at acquiring a second language, how sign languages differ from spoken languages, and how language variation and diversity affect education.

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology/Anthropology) collaborate to offer a comprehensive Linguistics Program. The courses that each department offers in the program are identifiable by their cross-listed numbers in the course descriptions section of this book.

Almost all the linguistics courses have been approved for the honors program, and many of the students are honors program students.

Linguistics offers interesting co-op and foreign study opportunities. Several students have taken advantage of international co-op and study abroad, including an internship program at the Max Planck Institute for Psycholinguistics in the Netherlands. Many students have taken co-ops as research assistants to linguistics scholars, especially in Northeastern's own psycholinguistics laboratories.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special education, business, computer science, and law.

Bachelor of Arts and Bachelor of Science Curriculum

LIN 1118, Introduction to Language and Linguistics 1; LIN 1215, Symbolic Logic; LIN 1218, Introduction to Language and Linguistics 2; LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1335, Language and Culture; and LIN 1401, Introduction to Syntax.

Second language requirement. Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a second language.

Additional courses. Four from the following (and other related courses by permission): LIN 1119, History of the English Language; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1263; Nonverbal Communication; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499/PSY 1499, Psychology of Reading; and LIN 1564, Laboratory in Cognition.

Lab course. LIN 1562, Laboratory in Psycholinguistics.

Seminar courses. Two from the following: LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics, and LIN 1693, Seminar in Linguistics.

Practicum course (in fieldwork, interpreting, teaching, etc.). LIN 1804, Directed Study.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

Same as the Bachelor of Arts, except that American Sign Language can count toward the second language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

A total of six courses is required. LIN 1118, Introduction to Language and Linguistics 1; and LIN 1218, Introduction to Language and Linguistics 2.

Plus one from the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; and LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499/PSY 1499, Psychology of Reading; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors
Samuel J. Blank, PhD
Bohumil Cenkl, ScD
Terence J. Gaffney, PhD
Maurice E. Gilmore, PhD
Mark Goresky, PhD
Arshag B. Hajian, PhD
Anthony Iarrobino, PhD
Venkatrama Lakshmibai, PhD
Marc N. Levine, PhD
Mikhail Malutov, PhD
Egon Schulte, PhD
Jayant M. Shah, PhD
Mikhail Shubin, PhD
Gabriel Stolzenberg, PhD
Chuu-Lian Terng, PhD
Jerzy M. Weyman, PhD
Andrei V. Zelevinsky, PhD

Associate Professors
Mark Bridger, PhD
Robert W. Case, PhD
Stanley J. Eigen, PhD
John N. Frampton, PhD
Eugene H. Gover, PhD
Samuel Gutmann, PhD
Solomon M. Jekel, PhD
Christopher K. King, PhD
Donald R. King, PhD
Nishan Krikorian, PhD
N. V. R. Mahadev, PhD
Alex Martsinkovsky, PhD
David Massey, PhD
Robert C. McOwen, PhD
Mark B. Ramras, PhD
Martin Schwarz, PhD
Thomas O. Sherman, PhD
Alexandru I. Suciu, PhD
Gordana G. Todorov, PhD

Assistant Professors
Aidong Adam Ding, PhD
Carla B. Oblas, MS

Lecturers
Jane E. Devoe, MS
Robert A. Lupi, MS
Peter J. Phillíou, MS
Steven W. Olson, ME

Professors Emeriti
Holland C. Filgo, PhD
Alberto R. Galmarino, PhD
Jack Warga, PhD

Mathematics is of ever-increasing importance to our society and everyday life. It has long been the language of science and technology, and provides a rich source of methods for analyzing and solving problems encountered in the physical world. Today, however, mathematics is essential in virtually all fields of human endeavor, including business, the arts, and the social sciences.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Students may satisfy the arts and sciences experiential education requirement by taking MTH 1360, Seminar in Applied Mathematics, or through student teaching; this applies only to students entering after the fall of 1995 or graduating after the year 2000.

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Students may satisfy the arts and sciences experiential education requirement by taking MTH 1360, Seminar in Applied Mathematics, or through student teaching; this applies only to students entering after the fall of 1995 or graduating after the year 2000.

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser: a) two must be selected from MTH 1200 or higher courses, e.g., MTH 1225, MTH 1226, MTH 1230, *or* MTH 1384 (these two courses may be required by the student's major program); b) the other two must be selected from MTH 1301–1399 and may **not** be among those required by the student's major program (MTH 1384 cannot be counted by many engineering majors and MTH 1301 cannot be counted by computer science majors; MTH 1301 cannot be counted at all if MTH 1230 is already counted in "a," above).

Modern Languages

Harlow L. Robinson, PhD, *Assistant Professor and Acting Chair*

Professors
Inez Hedges, PhD
Neil A. Larsen, PhD
Constance H. Rose, PhD
Stephen A. Sadow, PhD

Associate Professors
Lillian Bulwa, PhD
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Bonnie S. McSorley, PhD
Holbrook C. Robinson, PhD
John Spiegel, PhD

Assistant Professor
Robert B. Modee, MA

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Russian. It is possible to minor in Italian, Russian, or German. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas.

Bachelor of Arts in French Curriculum

LNF 1201, Intensive Review of French, LNF 1202, LNF 1203, and LNF 1204, French Composition Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French Speaking World; LNF 1309, LNF 1310, LNF 1311 and LNF 1312, French Literature of the Nineteenth through Twentieth Centuries; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

Bachelor of Arts in Spanish Curriculum

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture *or* LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th Century Literature 1 and 2; LNS 1311, LNS 1312, 20th Century Literature 1 and 2; LNS 1315, Latin American Literature 1; LNS 1506, Cervantes; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil Wars in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

David D. Sonnenschein, DMA, *Associate Professor and Chair*

Professors
Joshua R. Jacobson, DMA
Roland L. Nadeau, MM
Judith Tick, PhD

Associate Professors
William Lowe, MA
Dennis H. Miller, DMA
Bruce Ronkin, DMA

Assistant Professors
Susan Asai, PhD
Leonard L. Brown, PhD
Leon C. Janikian, MM

Lecturers
Marjorie J. Atlas, MM
Paul Beadoin, MM
Cornelia E. Boniface, MBA
Douglas F. Durant, PhD
Virginia Eskin, BA
Allen G. Feinstein, MM
Michelle L. Gorove, JD
Karen L. Pokross, EdM
Andrew J. Rega, BM
Jeanne M. Segal, MM
Robert Ward, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study.

The department offers four concentrations in the context of a broad liberal arts program. The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in artist management, marketing and promotion, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

The music teacher program is offered in coordination with the New England Conservatory of Music. This program leads to a Bachelor of Arts degree and to provisional Massachusetts teaching certification. An audition is required for this concentration.

The music literature and performance concentration combines history with hands-on music making. This concentration leads to a Bachelor of Arts degree and an audition is required. The music literature concentration has an historical orientation and leads to a Bachelor of Arts degree. All music students share an array of high-tech and multimedia equipment.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles.

Bachelor of Arts Curriculum

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS, 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301, MUS 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301 and 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1461, Applied Music Lessons (every quarter); MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

Students preparing for the Massachusetts Music Teaching Provisional Certification have to add the following courses: ED 1306, Measurement and Evaluation; ED 1412, Fundamentals of Curriculum Development; (NEC) Music Education Orientation; (NEC) ED 413, Teaching Choral Music; (NEC) ED 417, Teaching Instrumental Music; (NEC) ED 332, Teaching Classroom Music II; (NEC) ED 533, Philosophy of Music Education; (NEC) ED 461, Practice Teaching Seminar; and (NEC) ED 463, Practice Teaching.

Students in both concentrations must participate in at least one Northeastern University performing ensemble every quarter.

In addition, complete the arts and sciences core curriculum (see page 33).

Music teacher program. The Music department at Northeastern University and the New England Conservatory of Music have launched a coordinated Music Teacher Preparation Program. This comprehensive program, designed to meet the new Massachusetts state certification requirements, will prepare students for the music teaching profession. In accordance with the new state certification requirements, music teachers must earn a BA in music for provisional certification and a master's degree for standard certification. This new undergraduate program is a synthesis of Northeastern University's existing Music Literature and Performance major and a battery of New England Conservatory of Music Education courses as well as practice teaching (practicum). This program will lead to a Northeastern University BA degree in music with Massachusetts teacher certification (recognized by most states). Because enrollments are limited, the program should be considered to be competitive. For additional information and audition requirements for the BA in music, contact: Professor David Sonnenschein, Chair, Music Department, 351 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115.

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1171, Computer Literacy for Musicians; MUS 1421 and MUS 1425, Historical Traditions 1 and 5; any two of the following: MUS 1422, MUS 1423, MUS 1424, Historical Traditions 2, 3, and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry. Choose five music industry electives from: MUS 1167, Music Administration; MUS 1172, The Recording Studio; MUS 1173, The Recording Studio 2; MUS 1174, Music Production for Radio; MUS 1360, Artist Management; MUS 1362, Music Merchandising; MUS 1366, Copyright Law for Musicians; MUS 1367, Computer Applications in Music Business; ECN 1363, Economics of Art and Culture. Additional electives are planned.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302. MGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Management of Smaller Enterprises; HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1100, Introduction to Music; MUS 1211, Sightsinging; MUS 1244, Voice Class 1; INT 1110, American Musical Theatre *or* MUS 1132, Introduction to Opera; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Susan M. Setta, PhD, *Associate Professor and Chair*

Professor
Stephen L. Nathanson, PhD

Associate Professors
William J. DeAngelis, PhD
Michael Lipton, PhD
Gordon E. Pruett, PhD

Assistant Professor
Patricia Illingworth, JD, PhD

Lecturers
Margaret C. Huff
Michael C. Meyer, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine through critical reflection their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities. The department offers three ways to major in philosophy: the standard major, the concentration in law and ethics, and the concentration in religious studies.

Bachelor of Arts and Bachelor of Science Curriculum

The standard major offers the maximum number of electives to enable students to follow their own interests. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one seminar; and eight philosophy electives (to be selected after consultation with the student's adviser) to bring the total number of quarter hours in philosophy to fifty-two.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following: PHL 1435, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; and PHL 1335, Moral Philosophy; and three philosophy electives.

Concentration in law and ethics. Designed for the philosophy major seeking a career in law, the concentration focuses on the areas of law, social and political philosophy, and applied ethics. The concentration structures the electives so that the student's major serves both the fields of philosophy and those traditionally considered pre-law. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one philosophy seminar; and three electives drawn from the following: PHL 1130, Ethics: East and West; PHL 1135, Philosophical Problems of Law and Justice; PHL 1140, Social and Political Philosophy; PHL 1165, Moral Problems in Medicine; PHL 1170, Business Ethics; three law-related courses to be chosen in consultation with the student's adviser and drawn from social science departments; and three philosophy electives to bring the total number of quarter hours in the major to fifty-two.

Concentration in religious studies. Designed for philosophy majors seeking a career in religious studies, this concentration focuses on providing competency in comparative religion, textual analysis, and methodology. Through the concentration in religious studies, the students will understand the basic theologies, practices, and ethical systems of several of the world's larger faith traditions. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one seminar; PHL 1290, Cults and Sects *or* PHL 1345, Philosophy of Religion; three of the following: PHL 1100, Introduction to Religion: PHL 1275, Eastern Religions; PHL 1280, Islam; PHL 1315, Understanding the Bible; and five philosophy and religion electives to bring the total number of quarter hours in the major to fifty-two.

Physics

Paul M. Champion, PhD, *Professor and Chair*

Professors
Ronald Aaron, PhD
Petros N. Argyres, PhD
Arun Bansil, PhD
Alan H. Cromer, PhD
David A. Garelick, PhD
Haim Goldberg, PhD
Jorge V. José, PhD
Jacqueline Krim, PhD
Robert S. Markiewicz, PhD
Pran Nath, PhD
Clive H. Perry, PhD
Stephen Reucroft, PhD
Carl A. Shiffman, PhD
Jeffrey B. Sokoloff, PhD
Srinivas Sridhar, PhD
Yogendra N. Srivastava, PhD
Michael T. Vaughn, PhD
Eberhard von Goeler, PhD
Allan Widom, PhD
Fa Yueh Wu, PhD

Associate Professors
George O. Alverson, PhD
Alain S. Karma, PhD
Marie E. Machacek, PhD
Tomasz Taylor, PhD

Assistant Professors
Nathan Israeloff, PhD
J. Timothy Sage, PhD
John D. Swain, PhD
Darien Wood, PhD

Professors Emeriti
William L. Faissler, PhD
Marvin H. Friedman, PhD
Michael J. Glaubman, PhD
Walter Hauser, PhD
Bertram J. Malenka, PhD
Eugene J. Saletan, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5, and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; PHY 1415, Quantum Mechanics 1; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional science electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs; PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

Christopher J. Bosso, PhD, *Associate Professor and Chair*

Professors
Michael A. Baer, PhD
Robert E. Gilbert, PhD
Ronald D. Hedlund, PhD
William F. S. Miles, PhD
Suzanne P. Ogden, PhD
David A. Rochefort, PhD

Matthews University Distinguished Professor
Robert L. Cord, PhD

Distinguished Professor
Michael S. Dukakis, JD

Edward Brooke Professor
David E. Schmitt, PhD

Thomas P. O'Neill Chair in Public Life
William Crotty, PhD

Associate Professors
L. Gerald Bursey, PhD
Minton F. Goldman, PhD
William D. Kay, PhD
Eileen L. McDonagh, PhD
John H. Portz, PhD
Denis J. Sullivan, PhD
Michael C. Tolley, PhD

Assistant Professors
Leslie E. Armijo, PhD
Amilcar A. Barreto, Jr., PhD
Richard A. Loverd, PhD
William G. Mayer, PhD
Bruce A. Wallin, PhD

Political science majors study the art and science of politics, the structure and functions of government, political behavior, and public policy making. Political science is broad and interdisciplinary by nature, so students will learn about the political and policy dimensions of societies, economic systems, and cultures, today and across time, both in the United States and in other nations.

Political science majors can choose from a wide array of courses in American politics, international relations, comparative politics, public administration, and political theory. Majors can follow a general studies path, selecting from among electives as they go along, or they can pursue more structured and more specialized concentrations in law and legal issues, international and comparative politics, or public policy and administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Most students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as Project Vote Smart, the Model United Nations, the Model Arab League, the student government, or the College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations.

Bachelor of Arts Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought); experiential education requirement; six law and legal issues electives; and one general political science elective.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; POL 1260, Public Policy; and six public policy and administration electives.

Concentration in international relations and comparative politics. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112/IAF 1112, Introduction to International Relations; POL 1113/IAF 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; *or* POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and seven international relations and comparative politics electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought, *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; six law and legal issues electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; POL 1260, Public Policy; and five public policy and administration electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in international relations and comparative politics. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112/IAF 1112, Introduction to International Relations; POL 1113/IAF 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; *or* POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301 and POL 1302, Research Methods 1 and 2; experiential education requirement; and six international relations and comparative politics electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

James R. Stellar, PhD, *Professor and Chair*

Professors
Judith A. Hall, PhD
Stephen G. Harkins, PhD
Leon J. Kamin, PhD
Harlan L. Lane, PhD,
Doc. ès Lettres
Harry A. Mackay, PhD
Joanne L. Miller, PhD
Adam J. Reeves, PhD
Alexander A. Skavenski, PhD
Harold S. Zamansky, PhD

Associate Professors
Martin L. Block, PhD
Perrin S. Cohen, PhD
Rhea T. Eskew, PhD

Assistant Professors
Jane A. Bybee, PhD
Elizabeth Cole, PhD
C. Randall Colvin, PhD
Denise Jackson, PhD
Frank Naarendorp, PhD
Neal Pearlmutter, PhD
Fei Xu, PhD

Psychology is the study of human and animal behavior and the ways people think. An interdisciplinary science, psychology includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine.

Bachelor of Arts and Bachelor of Science Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language *or* PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs *or* two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; PSY 1241, Human Behavioral Development 1. Two courses from the following: PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Four psychology electives.

Sociology and Anthropology

T. Anthony Jones, PhD, *Associate Professor and Chair*

Professors
Arnold Arluke, PhD
Winifred Breines, PhD
Michael E. Brown, PhD
Morris Freilich, PhD
Christine Gailey, PhD
Debra R. Kaufman, PhD
Alan M. Klein, PhD
Thomas H. Koenig, PhD
Elliott A. Krause, PhD
Jack Levin, PhD
Ronald J. McAllister, PhD
Earl Rubington, PhD
Thomas M. Shapiro, PhD

Associate Professors
Michael Blim, PhD
Richard Bourne, PhD
Daniel R. Faber, PhD
Luis M. Falcon, PhD
Wilfred E. Holton, PhD
Maureen Kelleher, PhD
Carol A. Owen, PhD
Judith Perrolle, PhD
Gordana Rabrenovic, PhD
Lynn Stephen, PhD

Professor Emeritus
Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research.

Bachelor of Arts in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Sociology Curriculum

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course.

Bachelor of Arts in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Del Lewis, MFA, *Associate Professor and Chair*

Professor
Edward Bullins, MFA

Associate Professors
Janet L. Bobcean, MFA
Nancy Kindelan, PhD
Jerrold A. Phillips, PhD

Clinical Lecturer
Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—explores the techniques of creatively imaging or re-imaging the experiences of society and of the individual.

The program at Northeastern balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education.

Bachelor of Arts and Bachelor of Science Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1112, Dramatic Theory/Criticism; THE 1114, Masters of Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. All theatre majors must take ENG 1658, Introduction to Shakespeare, in the college core curriculum.

All theatre majors should select the following courses in their *freshman* year: (fall quarter) THE 1100, Introduction to Theatre Arts and THE 1200, Stagecraft; (winter quarter) THE 1150, Acting 1 (majors section) and THE 1800, Practicum in Production 1; (spring quarter) THE 1212, Introduction to Theatrical Design and THE 1801, Practicum in Production 2.

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1116, American Theatre *or* THE 1121, Contemporary Theatre; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and four courses from the following group: THE 1140, Playwriting; THE 1160, Movement 1; THE 1280, Stage Makeup; THE 1284, Theatre Management; THE 1325, Musical Theatre Technique; or THE 1410, Technical Production.

Concentration in production. THE 1209, Theatrical Drafting; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1284, Theatre Management; THE 1410, Technical Production; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and two courses from the following: THE 1213, Scene Design 2; THE 1225, Scene Painting; THE 1265, Pattern Drafting; THE 1280, Stage Makeup; THE 1400, Costuming 2; or THE 1430, Lighting 2. All production concentration majors must take electives ART 1101, Art History Since 1400 and ART 1124, Basic Drawing.

Concentration in performance. THE 1116, American Theatre *or* THE 1121, Contemporary Theatre; THE 1155, Voice for the Theatre; THE 1160, Movement 1; THE 1280, Stage Makeup; THE 1301, THE 1302, Acting 3 and 4; THE 1316, Acting for the Camera; THE 1325, Musical Theatre Technique; THE 1505, Continental Drama; and THE 1510, Twentieth Century Theatre. All performance concentration majors must take 4 quarter hours of dance/physical education electives (HSL).

All students must complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (majors section) (winter quarter); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1800, THE 1801, Practicum in Production 1 and 2; and one of the following: THE 1149, Script Analysis; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; and THE 1300, Acting 2. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required for the minor.

Music majors who wish to minor in musical theatre must take the following courses. THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150 and THE 1300, Acting 1 (majors section) (winter quarter) and 2; THE 1160, Movement 1; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Pharmacy and Health Sciences

James J. Gozzo, PhD, *Dean*
Mehdi Boroujerdi, PhD, *Associate Dean for Pharmacy*
Patrick F. Plunkett, EdD, *Associate Dean for Academic Affairs*
Ena Vasquez-Nuttal, EdD, *Associate Dean and Director of the Graduate School*
Anne M. Ahern, MEd, *Director of the Office of Student Services*
Nancy P. Warner, MS, *Academic Counselor*
Carol M. Konis, *Assistant to the Dean*
Barry Kass, MBA, *Director of Continuing Education and Development*

The programs in Bouvé College of Pharmacy and Health Sciences combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated pharmacists and allied health professionals. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care; a cooperative education work program, including a pharmacy externship-internship period and clinical affiliations in physical therapy and other health professions; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the American Association of Colleges of Pharmacy and the Association of Schools of Allied Health Professions.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate.

Sophomore	1.8
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX); and a C or better in professional courses (ATP and PTH). A required course in which an F or W grade is received can be repeated only once. If a grade of D is not considered passing in a professional course, the course can be repeated only once.

Pharmacy special requirements. Beginning with the Class of 2001 (Bachelor of Science program with PharmD tracking option) and with the Class of 2003 (entry-level Doctor of Pharmacy program), students in the first two years of the program must achieve a grade of C– or better in each course; all deficiencies, if any, must be cleared prior to the beginning of the middler year. A cumulative deficiency rule has been adopted such that a student can not continue in Pharmacy if a total of four deficiencies is earned. In addition, co-op requirements must be met.

For the Class of 2003, entry-level Doctor of Pharmacy students must earn an overall quality-point average of 2.5 for the first two years of coursework in order to enter the third year of the program. Students who fail to achieve the required 2.5 will be reviewed by a faculty committee and progress according to its recommendations. Beginning in their third year, students must achieve a grade of C– or better in each professional course to progress to the next academic quarter. Other specific requirements for each program and year of graduation are published in the *Bouvé College Undergraduate Student Information Manual* for the appropriate program and year of graduation.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, you must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, you must have a minimum quality-point average of 2.0 and have earned a C– or

better in all professional courses. To enter clinical studies in the junior and senior years, you must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, pharmacy, and physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year athletic training program is designed for students who are interested in an allied health-care profession specializing in the health care of athletes. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, evaluation, management, treatment, and rehabilitation of athletic injuries. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year and must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students are required to fulfill their clinical education requirements during academic quarters with athletic teams in approved settings at Northeastern University or other colleges, universities, and high schools in the Boston area.

The program is approved by the National Athletic Trainers Association and is in the process of seeking accreditation by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual may apply for Massachusetts licensure as an athletic trainer.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1105, General Chemistry for the Health Sciences 1; ENG 1110, Freshman English 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1652, Integrated Human Anatomy and

	Physiology 2 Lab; CHM 1106, General Chemistry for the Health Sciences 2; and ENG 1111, Freshman English 2.
Quarter 3	ATP 1050, Emergency Care of Athletic Injuries; BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; COM 1105, Computer Science and Its Applications; and SOC 1100, Introduction to Sociology.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; PSY 1111, Foundations of Psychology 1; and one elective.
Quarter 5	ATP 1200, Clinical Athletic Training; PHY1202, Physics for the Life Sciences 2; PTH 1310, Clinical Gross Anatomy; and one elective.
Quarter 6	ATP 1300, Lower Extremity Evaluation; ATP 1390, Athletic Training Practicum 1; CPS 1611, Kinesiology; CRS 1314, Introduction to Counseling; and Middler-Year Writing Requirement.
Quarter 7	ATP 1350, Upper Extremity Evaluation; ATP 1360, Applied Neuroscience; PSY 1112, Foundations of Psychology 2; and one elective.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1490, Athletic Training Practicum 2; CPS 1612, Exercise Physiology; and HSL 1468, Overview of Disabilities.
Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; HSL 1286, Nutrition; and one elective.
Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; CPS 1408, Research Design; SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

Mary E. Watson, EdD, RRT, *Associate Professor and Chair*

Associate Professors
Thomas A. Barnes, EdD, RRT
Marilyn A. Cairns, ScD
William J. Gillespie, EdD
Patrick F. Plunkett, EdD, RRT

Assistant Professor
Joseph R. Libonati, PhD

Assistant Clinical Specialists
Joseph A. Curro, MBA, RRT
Eric B. Pepin, EdD, CCP
Annemarie Sullivan, MS

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in cardiovascular technology, exercise physiology, or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization.

Cardiovascular Technology

The program in cardiovascular technology helps prepare students to assist cardiologists in performing diagnostic and interventional cardiac catheterizations, cardiac electrophysiology studies, pacemaker implantations, research protocols, and noninvasive testing such as echocardiography and nuclear imaging.

Before these procedures, the cardiovascular technologist prepares the instrument table, the procedure site, and the patient for the physician while maintaining sterile techniques at all times; attaches instruments for obtaining hemodynamic measurements throughout the procedure; and supplies all desired catheters, wires, sheaths, balloons, and devices needed by the physician.

During the procedures, the cardiovascular technologist is usually responsible for operating monitoring equipment and obtaining vital measurements from the patient, performing calculations from data, and informing physicians of any abnormal measurements or any changes in pressures or electrocardiograms. The cardiovascular technologist must be able to adapt preparations and procedures to meet the requirements of the individual case while maintaining the flexibility to deal with different situations.

All students in the cardiovascular technology specialization study fundamentals of cardiovascular technology, advanced cardiovascular technology, imaging modalities, echocardiography, clinical seminars, and clinical practice courses.

Most cardiovascular technologists work in hospitals as part of the health-care team. Others pursue biomedical research positions in companies or health-care facilities. Graduates are eligible for the registry examination for cardiovascular technology given by the National Society for Cardiopulmonary

Technology. Upon successful completion of the exam, an individual is designated a Registered Cardiovascular Technologist (RCVT).

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, cardiopulmonary assessment, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapists are instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the recognition Registered Respiratory Therapist (RRT). The program is accredited by the Commission on Accreditation of Allied Health Education Programs.

Bachelor of Science in Cardiopulmonary Science Curriculum

Quarter 1	CHM 1105, General Chemistry 1; COM 1105, Computer Science and Its Applications, CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, Freshman English 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1142, Basic Animal Biology 1; BIO 1642, Basic Animal Biology 1 Lab; CHM 1106, General Chemistry 2; CPS 1112, Cardiopulmonary Sciences Seminar 2; NUR 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; CPS 1114, Basic Life Support; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

Cardiovascular Technology Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Pharmacology; Electrocardiography; Cardiopulmonary

Assessment; Fundamentals of Cardiovascular Technology; Clinical Seminars; Advanced Cardiovascular Technology; Cardiovascular Technology Practicum 1 and 2; Imaging Modalities; Echocardiography; Advanced Cardiac Life Support; and arts and sciences electives.

Exercise Physiology Curriculum

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1 and 2, Research Design; Health Science Education; Cardiopulmonary Assessment; Electrocardiography; Pharmacology; Clinical Practicum 1 and 2; Clinical Seminar; Administrative Rehabilitation Programs; Advanced Cardiac Life Support; and electives.

Respiratory Therapy Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Introduction to Respiratory Care; Professional Practice Laboratories; Clinical Seminars; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2 and 3; Respiratory Care for the Medical and Surgical Patient; Respiratory Care for Critical Patients; Neonatal and Pediatric Respiratory Care; Advanced Cardiac Life Support; and electives.

Dental Hygiene

Linda Hanlon, RDH, BS, MEd, *Dean*
Judith S. Harvey, CDA, BA, MEd, *Director of Admissions*

The Forsyth School of Dental Hygiene conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is the "preventive oral health professional licensed in dental hygiene, who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health." In other words, the dental hygienist is that member of the oral health team who is responsible for the preventive aspects of dental treatment.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the United States Department of Education.

Application should be made directly to the Forsyth School of Dental Hygiene, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalogue, write that office or call 617-262-5200, extension 211, 212, or 213, FAX 617-262-4021.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Introduction to Human Biology; CHM 1105, General Chemistry for the Health Sciences 1; DHY 1204, Head and Neck Anatomy; and MTH 1106, Functions and Algebra.
Quarter 2	CHM 1106, General Chemistry for the Health Sciences 2; DHY 1101, Dental Hygiene Orientation 1; ENG 1110, Freshman English 1; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; DHY 1102, Dental Hygiene Orientation 2; ENG 1111, Freshman English 2; and PSY 1111, Foundations of Psychology 1.
Quarter 4	BIO 1160, Funcational Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; DHY 1100, Oral Anatomy & Histology; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 5	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 6	DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; DHY 1613, Clinical Dental Hygiene 3; PHP 1303, Interpersonal Skills for Health Professionals; and one Northeastern University elective (optional).
Quarter 7	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and MTH 1152, Statistical Thinking.

	Quarter 8	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and one Northeastern University elective.
	Quarter 9	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; and one Northeastern University elective.
	Quarter 10	DHY 1301, Introduction to Oral Health Research; DHY 1401, Oral Health Gerontology; ENG 1125, Technical Writing 1; and one Northeastern University elective.
	Quarter 11	DHY 1402, Advanced Public Health; PAH 1135, Professional Dynamics in the Health Care Delivery System; and two Northeastern University electives.
	Quarter 12	DHY 1403, Dental Seminars; DHY 1410, Independent Study; and DHY 1550, Internship.
Associate in Science Curriculum	Quarter 1	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
	Quarter 2	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
	Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; and DHY 1613, Clinical Dental Hygiene 3.
	Quarter 4	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and ENG 1110, Freshman English 1.
	Quarter 5	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and PSY 1111, Foundations of Psychology 1.
	Quarter 6	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; ENG 1111, Freshman English 2; and SOC 1100, Introduction to Sociology.

Health Information Administration

The Health Information Administration Program, formerly offered through the full-time day undergraduate college, will be offered through our evening division, University College. The program will be offered as an accelerated or part-time program. For further information, call 617-373-2818.

Medical Laboratory Science

Barbara E. Martin, MHP, MT(ASCP), CLS(NCA), *Director and Senior Clinical Specialist*

Professor
James J. Gozzo, PhD

Associate Professors
Judith T. Barr, ScD, CLS(NCA)
Britta L. Karlsson, MS, MT(ASCP), CLS(NCA)
Edward W. Schroder, PhD, M(ASCP)

Lecturers
David G. Grenache, PhD, MT(ASCP)
Walid Khouri, MS, MT(ASCP)
Frances Sullivan, BA, MT(ASCP)
Elizabeth Szymczak, MS, MT(ASCP)

Snell Visiting Professor
Mary Louise Turgeon, EdD, MT(ASCP), CLS(NCA)

Laboratory Coordinator
Judith Baronas, BS, MT(ASCP)

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological, chemical, and medical research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in

these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper class students have the opportunity for international placements. Recently students have had co-ops in Sweden and the United Kingdom. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate degree coursework toward subsequent studies for the baccalaureate degree.

Bachelor of Science Curriculum

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; CHM 1111, General Chemistry 1; ENG 1110, Freshman English 1; MLS 1101, MLS Orientation 1; and MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; MLS 1102, MLS Orientation 2; PAH 1135, Professional Dynamics in Health Care Delivery; PHY 1201, Physics 1; PHY 1501, Physics 1 Laboratory (optional); and one elective.
Quarter 3	CHM 1122, General Chemistry 2; ENG 1111, Freshman English 2; MLS 1104, Laboratory Techniques; PHY 1202, Physics 2; and PHY 1502, Physics 2 Laboratory.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Laboratory; PAH 1210, Anatomy and Physiology; and one elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1172, Basic Immunology; PAH 1212, Anatomy and Physiology; and one or two electives.
Quarter 6	BIO 1260, Genetics and Developmental Biology; CHM 1221, Analytical Chemistry; MLS 1145, Microbiology; MLS 1245, Microbiology Laboratory; and one elective.
Quarter 7	BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; ENG 1380, Writing for the Health Professions; MLS 1648, Advanced Microbiology; MLS 1649, Parasitology and Mycology; and one elective (optional).
Quarter 8	MLS 1125, Hematology; MLS 1132, Immunohematology; MLS 1152, Clinical Chemistry; MLS 1225, Hematology Laboratory; MLS 1232, Immunohematology Laboratory; MLS 1661, MLS Education; and one elective (optional).
Quarter 9	MLS 1252, Clinical Chemistry and Instrumentation Laboratory; MLS 1621, Advanced Hematology; MLS 1623, Special Topics in Hemostasis; MLS 1631, Advanced Immunohematology; MLS 1656, Advanced Clinical Chemistry; MLS 1672, Immunopathology; and one elective (optional).
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1573, Immunology 1 MT Applied Study 2; and MLS 1665, Management.
Quarter 11	MLS 1533, Immunohematology MT Applied Study; MLS 1552, MT Clinical Chemistry Applied Study; MLS 1574, Immunology 2 MT Applied Study, Senior Seminar.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of Medical Laboratory Science: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor and a baccalaureate degree, the student may be eligible for categorical national certification examination based on relevant work experience or completion of clinical applied studies. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry, who need organic chemistry.

Post-Baccalaureate Certificate Program

The post-baccalaureate certificate program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, clinical chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a categorical area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

Pharmacy

Department of Pharmaceutical Sciences

Mehdi Boroujerdi, PhD, *Professor and Interim Chair*

Professors
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Robert Hanson, PhD
Ban An Khaw, PhD

Associate Professors
Norman R. Boisse, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Edward W. Schroder, PhD
Barbara L. Waszczak, PhD

Assistant Professors
Mansoor Amiji, PhD
Jonathan Freedman, PhD
Eric J. Mack, PhD

Lecturer
Eugene A. Bernstein, PhD

Department of Pharmacy Practice

Samuel J. Matthews, PharmD, *Associate Professor and Interim Chair*

Professor
Gerald E. Schumacher, PharmD, PhD

Associate Professors
Judith T. Barr, ScD
Robert J. Cersosimo, PharmD
Louise G. Cohen, PharmD

Assistant Professors
Kristin C. Oberg, PharmD
Shirley M. Tsunoda, PharmD

Assistant Clinical Specialist
Todd A. Brown, BS
Jeanne L. Lucich, PharmD
Debra C. Mahfouz, PharmD
Deepa Setty, PharmD

Pharmacists promote the safe use of drugs by providing pharmacy care. The expanding role of the pharmacist as a clinical drug consultant to physicians, nurses, health care professionals, and patients has broadened the scope of professional opportunities. Pharmacists prepare and dispense the drugs prescribed by physicians. The roles of clinical drug expert and drug dispensing have given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in management, research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate schools.

The college offers three options for Pharmacy education. These curricula offer a blend of academic classroom and co-operative education experiences. The entry-level, co-operative education, six-year Doctor of Pharmacy program will open for entering freshmen in the fall of 1997. In addition, students who entered the Bachelor of Science in Pharmacy program in the fall of 1996 or before may apply for the six-year Doctor of Pharmacy Tracking Option after successful completion of the Bachelor of Science curriculum through quarter 9.

In order to be eligible for any pharmacy degree, a student must have satisfactorily completed all prescribed courses in his or her curriculum, have an overall 2.0 quality-point average (QPA), and must meet the co-operative education, clerkship, externship, and other requirements as stated in the *Bouvé College Undergraduate Student Information Manual* for his or her degree and year of graduation. These undergraduate programs subscribe to the standards established by the American Council of Pharmaceutical Education (ACPE) and the American Association of College of Pharmacy, and all are ACPE-accredited.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

The profession of pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community pharmacy offers the opportunity to combine specialized pharmaceutical training with skills in manage-

ment, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, health systems, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical companies, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, management, or law.

Doctor of Pharmacy Curriculum (Class of 2003)

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; ENG 1110, Freshman English 1; PHP 1102, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry for the Life Sciences 1; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Basic Calculus 2; COM 1105, Computer Science and Its Applications; COP 1350, Pharmacy Co-op Seminar 1; and one arts and sciences elective.
Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, General Chemistry for the Life Sciences 2B; ENG 1111, Freshman English 2; PMD 1100, Practice Laboratory 1; MTH 1108, Basic Calculus 2 *or* one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry for Biology Science Majors 1; PHY 1201, Physics for the Life Sciences 1; one directed elective*; and one open elective*.
Quarter 5	CHM 1265, Organic Chemistry for Biology Science Majors 2; PHY 1203, Physics for the Life Sciences 3; one directed elective*; and one open elective*.

*Directed electives: Students must choose one elective in psychology (PSY) and one elective in economics (ECN) from an approved course list available in the Student Service Office, 113 Mugar. Open electives may be chosen from any arts and sciences category, from business (for nonbusiness majors), or from computer science. Restrictions and prerequisites placed by other colleges must be honored.

Additional Professional and Required Courses

Year 3 (3 quarters of coursework and one Co-op)	Bio-Organic Medicinal Chemistry; Biochemistry; Human Physiology 1 and 2; Pathophysiology 1 and 2; Health Care Systems; Immunology and Biotechnology; Communication Skills for Pharmacy Practice; Medical Microbiology and Antimicrobials; Drug Information and Evaluation; Writing Workshop; Pharmaceutical Calculations; Drug Delivery; Drug Delivery Laboratory; and Pharmacy Care Seminar.
Year 4 (2 quarters of coursework and two Co-ops)	Physical Pharmacy; Physical Pharmacy Laboratory; Pharmacology 1, 2, and 3; Principles of Chemistry; Pharmacy Management 1 and 2; Nonprescription Medicine; Integrated Science and Therapeutics 1 and 2; Therapeutic Drug Monitoring and Patient Applications; Pharmacy Care 1 and 2; and two professional elective modules.
Year 5 (3 quarters of coursework and one Co-op)	Integrated Science and Therapeutics 3-8; Research Methods and Biostatistics; Pharmacy Care 3; Decision Sciences in Pharmacy; Clinical Toxicology Module; Jurisprudence; Pharmacy Ethics; Practice Laboratory 2; and four professional elective modules.
Year 6	Three quarters of required and elective Pharmacy Experiential Clerkship rotations designed to meet Doctor of Pharmacy requirements.

Bachelor of Science with Doctor of Pharmacy Tracking Option (Class of 1998–2001)

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics *or* MTH 1107, Functions and Basic Calculus; PHP 1102, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; ENG 1110, Freshman English 1; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health Care Delivery.
Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, Freshman English 2; MTH 1108, Calculus or an open elective; and one arts and sciences elective.

Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry 1; PCT 1240, Pharmaceutical Calculations *or* PAH 1202, Anatomy and Physiology 1; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology 1 *or* PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
Quarter 6	PCT 1300, Dosage Forms; PCT 1320, Dosage Forms Laboratory; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; PCT 1340, Physical Pharmacy; and PCT 1360, Physical Pharmacy Laboratory.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
	Students admitted in the fall of 1996 or before must satisfactorily complete the curriculum above through quarter 9. During the winter quarter of their junior year, students must elect to complete the Bachelor of Science program or may apply for admission to the Doctor of Pharmacy Tracking Option. Applicants for the track must have a good academic record showing an overall quality-point average (QPA) of 2.75 or better, and must complete an application that includes a personal goals statement and letters of recommendation from faculty and co-op employers. Acceptance to the track is made on a space-available basis.

Fifth Year (Bachelor of Science)

Quarter 10 (Summer/ Winter)	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1302, Pharmacy Administration 1; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Doctor of Pharmacy Tracking Option

For students who entered as freshmen in the fall of 1996 and before (Bachelor of Science class of 2001, 2000, 1999, and 1998 who have been, or may be, admitted as tracking students for the PharmD classes of 2002, 2001, 2000, 1999, and 1998) and for students transferring to the classes of 2000 and 2001 who may be eligible for the track.

Fifth Year

Quarter 10	PHP 1501, Ambulatory Pharmacy Externship.
Quarter 11	PHP 1615, Clinical Immunology; PMD 1501, Advanced Pathophysiology/Pharmacotherapeutics 1 (formerly PAH 3214); TOX 1300, Clinical Toxicology; and one professional elective.
Quarter 12	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Laboratory; PMD 1502, Advanced Pathophysiology/Pharmacotherapeutics 2 (formerly PAH 3215); PMD 1511, Pharmacy Research and Evaluation (formerly MHP 3201); PMD 1512, Biometrics (formerly PAH 3201).
Quarter 13	PHP 1302, Pharmacy Administration 1; PMD 1503, Advanced Pathophysiology/Pharmacotherapeutics 3 (formerly PAH 3216); PMD 1515, Pharmacoeconomics; and one professional elective.

Sixth Year

Quarter 14	PMD 1600, Institutional Experience (formerly PAH 3330); PMD 1601, Clinical Clerkship 1 (formerly PAH 3322).
Quarter 15	PMD 1602, Clinical Clerkship 2 (formerly PAH 3323).
Quarter 16	PMD 1603, Clinical Clerkship 3 (formerly PAH 3324).
Quarter 17	PMD 1604, Clinical Clerkship 4 (formerly PAH 3325).

A student must successfully complete each section of the Advanced Pathophysiology/ Pharmacotherapeutics sequence in order to progress to the next section (PMD 1501, PMD 1502, PMD 1503) and to the Clerkship portion of the curriculum. Each Clerkship must be completed with a grade of C or better.

Bachelor of Science Option Fifth Year

Physical Therapy

Meredith H. Harris, EdD, PT, *Associate Professor and Chair*
Ann Noonan, EdD, PT, *Associate Chair*

Associate Professors
Janice S. Bruckner, PhD
Robert Sikes, PhD
Chad A. Starkey, PhD,
Program Director, Athletic Training

Associate Clinical Specialist
Cindy I. Buchanan, MS

Assistant Clinical Specialists
Joseph Cigna, PhD, PT
Xristos Gaglias, MS, AT
Ann Golub, MS, PT, PCS
Sonya L. Larrieux, MA, PT
Mary O'Brien, MPH, PT
Donnalee Shain, MS, PT
Nancy H. Sharby, MS, PT
Margaret Stacey, MS, AT

Entry-Level MSPT Program

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery. The first five years of this curriculum result in a Bachelor of Science degree in rehabilitation science. The program in physical therapy culminates at the end of six years in an entry-level Master of Science degree in physical therapy.

Physical therapists evaluate the condition of the patient, plan and execute treatment programs developed to meet the patient's treatment goals, and regularly reassess those treatment goals. Physical therapists develop injury-prevention and health-promotion activities and integrate their treatment plans into the total care plan for the patient. Additional responsibilities of the physical therapist may include health-care planning, supervision of support staff, and community service.

Physical therapists function in a variety of settings, including community and university hospitals; rehabilitation centers; private practices; educational settings; extended care facilities; freestanding outpatient clinics; home health agencies; and community, state, and federal agencies. They are also involved in scientific and clinical research as well as teaching.

Through a commitment to excellence in teaching, research, and service, the Department of Physical Therapy develops individuals who are clinically competent, independent thinking, health-care professionals. The program incorporates the University's Academic Common Experience objectives and encourages the development of communication skills, critical and creative thinking, information literacy, and interpersonal skills. It also emphasizes the importance of developing historical, ethical, aesthetic, and personal perspectives, and of understanding the contexts provided by natural, social, and cultural worlds (including a multicultural understanding). In the classroom, students develop problem-solving skills, manual dexterity, and proficiency in technique and with equipment.

Physical therapy students alternate quarters of academic study with quarters of cooperative education work experience. Students may be employed as physical therapy co-op students with increasing responsibilities commensurate with their academic studies, or they may perform other health-related subprofessional duties. These experiences provide an opportunity for the application and reinforcement of the lessons of the classroom and laboratory. Prior to graduation, students have 18 months of related work experience.

In addition to cooperative education, the program includes periods of clinical experience, called affiliations, during which the student performs all duties of the physical therapist under the supervision of a licensed physical therapist.

Cooperative education placements and affiliations are available in a wide range of specialties and are located at sites throughout the country.

Students are accepted into the program as freshmen and do not need to reapply. During the freshman year, students take a course in basic physical therapy procedures, so they not only begin to

study their major immediately but also are prepared for their cooperative education experience. To continue in the program, students must maintain acceptable standards of scholarship and academic performance as outlined in the student handbook. Students must develop appropriate motor skills, professional behavior, and emotional maturity.

The program in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Graduates of the Master of Science in Physical Therapy (MSPT) program are eligible to sit for the Physical Therapy Licensure Examination.

Bachelor of Science in Rehabilitation Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1105, Chemistry for Health Sciences 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus.
Quarter 1 or 2	PTH1001, Introduction to Physical Therapy and Cooperative Education.
Quarter 2	BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1653, Integrated Human Anatomy and Physiology 2 Lab; CHM 1106, Chemistry for Health Sciences 2; and ENG 1110, Freshman English 1.
Quarter 3	BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; MTH 1150, Probability, Statistics and the Computer; and ENG 1111, Freshman English 2.
Quarter 1, 2, or 3	COM 1105, Computer Science and Its Applications; and designated electives.*
Quarter 4	CPS 1615, Exercise Physiology 1 with lab; PTH 1252, Clinical Gross Anatomy 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics for the Life Sciences 1 Lab; and PSY 1111, Foundations of Psychology 1.
Quarter 5	PSY 1112, Foundations of Psychology 2; PTH 1253, Clinical Gross Anatomy 2; PHY 1202, Physics for the Life Sciences 2; and PTH 1202, Therapeutic Modalities.

*Designated electives: Students must take one course in three of the following areas: sociology/anthropology, fine arts, and history/political science.

Additional Professional and Required Courses

Kinesiology; Neuroanatomy; Psychosocial Aspects of Illness; Clinical Medicine 1 and 2; Writing Workshop; Neuromuscular Physiology; Cardiopulmonary Rehabilitation in Physical Therapy; Developmental Basis of Human Performance; courses in Musculoskeletal Evaluation and Treatment; Neurological Evaluation and Treatment; Role of Communication and Health Promotion in Physical Therapy; Clinical Education Seminar; Research Methods; Pediatric Neurology; Pediatric Evaluation and Treatment; Functional Aspects of Aging; Physical Therapy in the Health-Care System; Health Science Education; Issues in Medical Ethics; Physical Therapy Project 1; open electives; professional electives; and Supervised Clinical Education 1.

Graduate Year

Physical Therapy Project 2 and 3; Administration; Pharmacology; Graduate Seminar; Advanced Clinical Processes; graduate elective; Clinical Integration; and Supervised Clinical Education 2 and 3.

Speech-Language Pathology and Audiology

Kevin P. Kearns, PhD, *Associate Professor and Chair*

Professors
Arlene Greenstein, PhD
Mary Florentine, PhD

Associate Professors
Linda Ferrier, PhD
Robert Redden, EdD

Assistant Professor
Gregory Lof, PhD

Clinical Specialists
Helen Anis, MA
Jane S. Doyle, MS
Denise J. Frankoff, MA
Mary Beth Lannon, EdD
Marjorie North, MA

Research Faculty
Christine Rankovic, PhD
Deborah Ingenito, MS

Speech-language pathologists and audiologists are involved with the evaluation and treatment of, and counseling and research in, human communication and its disorders. The speech-language pathology and audiology program is designed to help students develop entry-level competencies that will enable them to function in a preprofessional capacity in educational settings, medical and rehabilitation centers, and private practice clinics. Students will be exposed to a wide variety of communication disorders through observations and participation in activities at the Northeastern University Speech and Hearing Center. Externship in schools, hospitals, or other relevant settings will also broaden students' exposure and prepare them for graduate study or employment.

Speech-language pathologists and audiologists provide clinical services to a full range of communicatively impaired individuals from infants through geriatrics. Speech-language pathologists treat disorders such as developmental language and articulation disorders, voice and resonance problems, stuttering, and language and cognitive impairments due to stroke, head injury, and progressive neurologic diseases. Audiologists specialize in the prevention, identification, assessment and rehabilitation of hearing disorders. Both congenital and acquired hearing impairments are seen for services by audiologists. They prescribe and dispense hearing aids and instruct individuals in the use of amplification. Undergraduate students take courses in both speech-language pathology and audiology in preparation for advanced training and specialization at the graduate level.

The bachelor of science degree program in speech-language pathology and audiology includes an experiential learning component, a broad-based academic core, and the scientific and clinical coursework necessary for understanding normal and disordered communication. The degree offers preprofessional training for individuals who want to pursue graduate education in speech-language pathology and audiology. Alternately, graduates may be hired as speech and hearing assistants in a variety of clinical settings, or they may pursue other career paths in health care and education.

The speech-language pathology and audiology curriculum is designed to facilitate critical thinking, information literacy, and oral and written communication skills. In addition to coursework in the basic communication sciences, coursework is required in special needs/education, allied health, computer literacy, ethics, multicultural/diversity issues, and psychology. The curriculum provides a solid foundation in speech-language pathology and audiology and arts and sciences, and it is sufficiently flexible to provide students with the opportunity to minor in a related interest area.

A unique aspect of the program is an accelerated graduate provision for students who qualify at the end of year three. Students who have maintained a QPA of 3.25 or better, who have a departmental endorsement, and who have satisfied all graduate program admissions requirements may seek admission to Northeastern University's graduate program in speech-language pathology and audiology. In effect, students who enter the accelerated master's degree track will complete the bachelor of science requirements within the framework of our graduate program. They will be eligible for the master of science and bachelor of science degrees and meet national certification requirements at the end of their fifth year of matriculation. The accelerated track will be selective and a restricted number of students will be admitted each year. The graduate programs in speech-language pathology and audiology and the University's Speech and Hearing Center are fully accredited by the American Speech-Language-Hearing Association.

Class Entrance Requirements

Students in speech-language pathology and audiology are required to obtain a grade of C or better in professional courses. A required course in which a grade below C or a grade of W is received can be repeated only once.

Special Requirements

During the first two years, speech-language pathology and audiology students must achieve a grade of C or better in each of the prerequisite sciences, as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the speech-language pathology and audiology program and department.

Quarter 1	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; ENG 1110, Freshman English 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; and SLA 1101, Introduction to Speech and Hearing.
Quarter 2	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; COM 1105, Computer Science and Its Applications; ENG 1111, Freshman English 2; and PSY 1111, Foundations of Psychology 1.
Quarter 3	MTH 1150, Probability, Statistics and the Computer; PSY 1112, Foundations of Psychology 2; PSY 1231, Learning and Motivation 1; and NUR 1282, Wellness or Bouvé/allied health elective.
Quarter 4	SLA 1201, Anatomy and Physiology of Vocal Mechanisms; SLA 1300, Language Acquisition; and two electives.
Quarter 5	PHL 1165, Moral Problems in Medicine or ethics elective; SOC 1160, Gender in a Changing Society *or* multicultural/diversity elective; SLA 1301, Phonetics; one elective; and co-op orientation (1 QH).
Quarter 6	CMN 1330, Interpersonal Communication 1 or communication elective; SLA 1200, Hearing Science; SLA 1400, Speech Science; and one elective.
Quarter 7 (Summer)	Co-op
Quarter 8 (Fall)	Co-op
Quarter 9	ENG 1380, Writing for the Health Professions; PSY 1262, Psychology of Language *or* psychology elective; _____, Speech-Language Pathology; and SLA 1460, Neurological Bases of Communication.
Quarter 10	SLA 1303, Introduction to Audiology; SOC 1217, Women, Health, and Social Change *or* diversity/multicultural elective; Speech Pathology 2; and one elective.
Quarter 11	PSY 1364, Cognition *or* psychology elective; SLA 1403, Clinical Procedures, Speech; Clinical Procedures, Audiology *or* elective; PSY 1364, Cognition *or* psychology elective.
Quarter 12	ED 1311, Case Management: Diagnosis and Treatment *or* ED/CRS elective; SLA 3629, Aural Rehabilitation; SLA elective; and one open elective.
Quarter 13	Co-op in speech-language pathology and audiology.
Quarter 14	SLA seminar in speech-language pathology and audiology (with co-op component); SLA 3660, Early Intervention *or* SLA elective; and two electives.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the work force or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies.

Bachelor of Science Curriculum	Quarter 1	BIO 1108, General Biology 1; BIO 1608, General Biology Lab; ENG 1110, English 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
	Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; PHY 1201, Physics 1; and one arts and sciences elective.
	Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
	Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
	Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.
	Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
	Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
	Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology; and one professional elective.
	Quarter 9	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1813, Toxicology Research *or* one professional elective.
	Quarter 10	CHM 1432, Instrumental Analysis *or* CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1811, Toxicology Research; and one arts and sciences elective.
	Quarter 11	MLS 4341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; TOX 1813, Toxicology Research; and one or two arts and sciences electives.

College of Business Administration

Ira R. Weiss, PhD, *Dean*
Roger M. Atherton, Jr., PhD, *Senior Associate Dean for Academic Affairs*
Jay A. Halfond, PhD, *Associate Dean for Administration*
William I. Kelly, MS, *Director, Graduate School of Professional Accounting*
Brendan D. Bannister, DBA, *Associate Dean for Undergraduate Programs*
William F. Crittenden, PhD, *Associate Dean for Graduate Programs*

Accounting Group

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Paul A. Janell, PhD,
Joseph M. Golemme Professor of Accounting
Ira R. Weiss, PhD

Associate Professors
Jean C. Bedard, PhD
Julie Hertenstein, DBA
Marjorie Platt, PhD
H. David Sherman, DBA

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James J. Maroney, PhD
Timothy J. Rupert, PhD

Lecturers
Michael D. Cottrill, MAC
Hugh J. Crossland, LLM
Lynn W. Marples, MBA
Peggy L. O'Kelly, MBA

Finance and Insurance Group

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Harlan D. Platt, PhD
Jonathan B. Welch, PhD

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Jeffery A. Born, PhD
Donald G. Margotta, PhD

Assistant Professors
Vahan Janjigian, PhD
Mark Kazarosian, PhD
Steven R. Kursh, PhD
Robert M. Mooradian, PhD
Donald Rich, PhD
Harley E. Ryan, Jr., PhD
Emery A. Trahan, PhD
Shiawee X. Yang, PhD

Lecturer
Peggy L. Fletcher, MBA

General Management Group

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Daniel J. McCarthy, DBA
Ravi Sarathy, PhD
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Marc H. Meyer, PhD
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Carl W. Nelson, PhD
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Assistant Professor
Nicholas Athanassiou, PhD

Lecturers
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Louise Kelly, MBA
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Ralph Katz, PhD

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Sheila M. Puffer, PhD
Bert A. Spector, PhD
Francis C. Spital, PhD
Edward G. Wertheim, PhD

Assistant Professor
Judith Y. Weisinger, PhD

Lecturer
Leonard J. Glick, EdD

Management Science Group

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Michael J. Maggard, PhD
Robert A. Millen, PhD

Associate Professors
Ramaiya Balachandra, PhD
Victor B. Godin, DBA
Robert A. Parsons, MA
Marius M. Solomon, PhD
Eileen M. Trauth, PhD
Merrill E. Warkentin, PhD
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Assistant Professor
Michael H. Zack, DBA

Lecturers
Richard J. Briotta, MBA
Mohamed Habibullah, PhD

Marketing Group

Professors
Samuel Rabino, PhD
Frederick Wiseman, PhD

Associate Professors
Dan T. Dunn, Jr., DBA
Fareena Sultan, PhD
Robert F. Young, DBA

Assistant Professors
Gloria Barczak, PhD
Bruce H. Clark, PhD

Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to Freshman English I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation. Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

Minor in Business Administration

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macro economics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Financial Accounting; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs which recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Five-Year Bachelor of Science Curriculum for First Three Quarters

The courses taken in the first three quarters of the five-year program are the same for all concentrations.

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, Freshman English 1; and two arts and sciences electives.
Quarter 2	MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; MSC 1226, Computer-Based Information Systems; and one arts and sciences elective.

Four-Year Bachelor of Science Curriculum for First Five Quarters

The courses taken in the first five quarters of the four-year program are the same for all concentrations.

Quarter 1	MGT 1115, Introduction to Business; non-business elective or MTH 1113, Mathematics for Business and Economics; ENG 1110, Freshman English 1, and a non-business elective.
Quarter 2	ECN 1115, Principles of Macroeconomics; MTH 1114, Calculus for Business; and two non-business electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; MSC 1226, Computer-Based Information Systems; and two non-business electives.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; ENG 1381, Writing for the Professions: Business Administration; and two non-business electives.

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See above.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.

	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
	Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
	Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and one nonbusiness elective.
	Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
	Quarter 9	ACC 1347, Auditing; MGT 1446, Managing Legal, Ethical, and Social Issues; an upper division writing requirement; and an open elective.
	Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
	Quarter 11	Three open electives and a nonbusiness elective.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 89.
	Quarter 6	ACC 1331, Intermediate Accounting 1; ACC 1339, Cost Accounting; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management.
	Quarter 7	ACC 1332, Intermediate Accounting 2; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one nonbusiness elective.
	Quarter 8	ACC 1343, Intermediate Accounting 3; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
	Quarter 9	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; ACC 1345, Accounting Systems; and two open electives.
	Quarter 10	ACC 1347, Auditing; and three open electives.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 89.
	Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.
	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
	Quarter 6	ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; an open elective; and a nonbusiness elective.
	Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and an open elective.
	Quarter 8	ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement.
	Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1441, Operations Management; and an open elective.
	Quarter 10	MGT 1450, Business Policy; ENT 1352, New Venture Creation; and two open electives.
	Quarter 11	ENT 1358, Small Business Institute Field Project; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 89.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one open elective; and one nonbusiness elective.
Quarter 7	ENT 1330, Small Business Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1770, Small Business Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; ENT 1344, Opportunity Analysis and Venture Capital; and an open elective.
Quarter 9	MGT 1450, Business Policy; and four open electives.
Quarter 10	ENT 1352, New Venture Creation; ENT 1358, Small Business Institute Project; and an open elective.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; and two nonbusiness electives.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.
Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Legal, Ethical, and Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 89.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MSC 1441, Operations Management; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2, HRM 1433, Organizational Behavior and Design; one open elective; and one nonbusiness elective.
Quarter 8	FIN 1335, Managerial Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
Quarter 9	FIN 1346, Investment Management; MGT 1450, Business Policy; one finance elective; and two open electives.
Quarter 10	Two finance electives and two open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse work force and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; an open elective; and a nonbusiness elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; human resources management elective; upper division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 89.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; HRM 1433, Organizational Behavior and Design.
Quarter 7	HRM 1332, Introduction to Human Resource Management; FIN 1439, Principles of Finance 2; two open electives; and one nonbusiness elective.
Quarter 8	HRM 1345, Contemporary Labor Issues; MGT 1446, Managing Legal, Ethical, and Social Issues; one HRM elective; and an open elective.
Quarter 9	HRM 1348, Reward Systems; HRM 1349, Selection and Assessment; MGT 1450, Business Policy; and two open electives.
Quarter 10	Human resources management elective and three open electives.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the

humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middler, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433,Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; two open electives; and one nonbusiness elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international nonbusiness elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Legal, Ethical, and Social Issues; upper division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 89.
Quarter 6	INB 1338, Introduction to International Business; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and two open electives.
Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; one IB elective; and two open electives.
Quarter 9	FIN 1759, International Financial Markets; MGT 1450, Business Policy; one business elective; and two open electives.
Quarter 10	INB 1352, Seminar in International Business; one IB elective; and two open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is useful for a student therefore to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433,Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.
Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; an open elective; and a nonbusiness elective.
Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
Quarter 11	TRN 1353, Seminar in Transportation; and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 89.
Quarter 6	TRN 1333, Domestic Transportation System; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; one TRN elective; and one open elective.
Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; and three open electives.
Quarter 9	MGT 1450, Business Policy; TRN 1344, Business/Logistics; one TRN elective; and two open electives.
Quarter 10	TRN 1353, Seminar in Transportation and Logistics; one TRN elective; and two open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to "people problems" in order to stress the importance of developing an effective work force.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.

	Quarter 7	MSC 1341, Information Resource Management; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and a nonbusiness elective.
	Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
	Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; a business elective; an open elective; and upper division writing requirement.
	Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
	Quarter 11	Business elective and three open electives.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 89.
	Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one business elective; and one nonbusiness elective.
	Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
	Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; and three open electives.
	Quarter 9	MSC 1341, Information Resource Management; MGT 1450, Business Policy; MGT 1345, Legal Aspects of Business; and two open electives.
	Quarter 10	HRM 1350, Strategic Management of Human Resources; MGT 1350, Advanced Strategic Management; and two open electives.

Management Information Systems

The concentration in management information systems (MIS) is designed to teach tomorrow's managers how to derive the maximum benefit from state-of-the-art information technology.

The program provides a background in two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track, often referred to as "end-user computing," deals with the direct linkage of decision makers and user-friendly computer facilities.

Through an in-depth examination of case studies, the capstone senior year course, Business Systems Integration, illustrates how management information technology is used to identify and solve an organization's information-related problems.

MIS managers interact frequently with other managers throughout an organization; therefore students are encouraged to complete a dual concentration in one of the functional areas of management.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 89.
	Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
	Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and one open elective.
	Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and one open elective.
	Quarter 7	FIN 1439, Principles of Finance 2; MSC 1335, Telecommunications and Networks; an open elective; and a nonbusiness elective.
	Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.
	Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1336, Business Programming; upper division writing requirement; and a nonbusiness elective.
	Quarter 10	MGT 1450, Business Policy; MSC 1350, Database Management Systems; MSC 1341, Information Resource Management; and one open elective.
	Quarter 11	MSC 1342, Business Systems Integration; and three open electives.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 89.
	Quarter 6	MSC 1335, Telecommunications and Networks; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and a nonbusiness elective.

Quarter 7	MSC 1336, Business Programming; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MSC 1341, Information Resource Management; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
Quarter 9	MSC 1330, Data Management; MGT 1450, Business Policy; MSC 1332, Business Support Systems for Business; and two open electives.
Quarter 10	MSC 1342, Business Systems Integration; and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ACC 1111, Financial Accounting; MKT 1435, Introduction to Marketing; MSC 1200, Business Statistics 1; and a nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; two nonbusiness electives; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
Quarter 11	Marketing elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 89.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one open elective; and one nonbusiness elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MKT 1341, Marketing Research; MGT 1446, Managing Legal, Ethical, and Social Issues; one MKT elective; and an open elective.
Quarter 9	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; one MKT elective; and two open electives.
Quarter 10	Marketing elective and three open electives.

International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Bachelor of Science in International Business

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see page 88) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

College of Computer Science

Larry A. Finkelstein, PhD, *Dean*
Agnes H. Chan, PhD, *Associate Dean and Director of Graduate Studies*
Richard A. Rasala, PhD, *Associate Dean and Director of Undergraduate Studies*
Marie P. Hinds, BS, *Director, Student and Administrative Services*

Professors
Agnes H. Chan, PhD
Gene D. Cooperman, PhD
Harriet J. Fell, PhD
Larry A. Finkelstein, PhD
Karl J. Lieberherr, PhD
Richard A. Rasala, PhD
Betty J. Salzberg, PhD
Raoul N. Smith, PhD
Mitchell Wand, PhD
Patrick S. P. Wang, PhD

Associate Professors
Kenneth P. Baclawski, PhD
John Casey, BA
William D. Clinger, PhD
Robert P. Futrelle, PhD
Carole D. Hafner, PhD
Viera K. Proulx, PhD
Ronald J. Williams, PhD
Bryant W. York, PhD

Assistant Professors
Ibrahim M. Matta, PhD
Boaz Patt-Shamir, PhD

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices which support the development of high quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education.

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.7
Middler	1.9
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook.*

Minor in Computer Science

This minor is particularly valuable to non-computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG 1125, Technical Writing 1; and one sub-area or general elective.
Quarter 8	COM 1205, Software Design; MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; and one computer science elective.
Quarter 9	MTH 1387, Probability 1; two computer science electives; and one sub-area or general elective.
Quarter 10	COM 1390, Algorithms; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; and three sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1350, Automata and Formal Language; MTH 1387, Probability; and two sub-area or general electives.
Quarter 7	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.

	Quarter 8	COM 1102, Functional Programming and Applications; ENG 1125, Technical Writing 1; one sub-area or general elective; and one computer science elective.
	Quarter 9	MTH 1301, Linear Algebra; two computer science electives; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; one general elective; one science elective; and one arts and sciences core course.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science elective.
	Quarter 6	COM 1390, Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG ____, middler-year writing requirement; and two arts and sciences core courses.
	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the second year)	Quarter 1	ENG 1110, Freshman English 1; MTH 1123, Calculus 1; one science elective; and one arts and sciences core course.
	Quarter 2	MTH 1124, Calculus 2; one general elective; one science elective; and one arts and sciences core course.
	Quarter 3	ENG 1111, Freshman English 2; MTH 1125, Calculus 3; one general elective; and one science elective.
	Quarter 4	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; MTH 1137, Discrete Mathematics 1; and two arts and sciences core courses.
	Quarter 5	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1240, Chaos and Fractals; and two arts and sciences core courses.
	Quarter 6	COM 1201, Algorithms and Data Structures 2; COM 1130, Computer Organization and Design; one general elective; and one arts and sciences core course.
	Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG ____, middler-year writing requirement; and one arts and sciences core course.
	Quarter 8	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one general elective.
	Quarter 9	COM 1358, Analysis of Programming Languages; one computer science elective; one general elective; and one arts and sciences core course.

	Quarter 10	Two computer science electives; one general elective; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Four-Year Bachelor of Arts Curriculum	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structure 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; one science course; and two arts and sciences core courses.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science course.
	Quarter 6	COM 1358, Analysis of Programming Languages; one general elective; and two arts and sciences core courses.
	Quarter 7	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
	Quarter 8	ENG ____, middler-year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*
Robert D. Croatti, AB, *Associate Dean for Academic Operations and Programs*
Lester W. McCullough, Jr., BA, *Assistant Dean for Academic Services*
Robert E. Fuller, MA, *Assistant Dean for Student Administrative Services*
Charlayne Wilson, MEd, *Academic Counselor*

Professors
Edith E. Flynn, PhD
John H. Laub, PhD
Nicole F. Rafter, PhD

Associate Professors
Frank A. Schubert, JD
Wallace W. Sherwood, LLM

Assistant Professors
Nanette Graham, PhD
John F. McDevitt, MPA
Michael Shively, PhD
Mary Ann Zager, PhD

Schulman Professor
Harvey Burstein, JD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its kind. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors of the criminal justice field.

The college has a unified undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains. Building on a solid foundation of required courses focusing on law, criminology, administration of justice, and research tools, the curriculum allows students to tailor their elective coursework, in such areas as homicide, terrorism, victims, juvenile justice, security, courts, and corrections, to suit their own professional interests. In addition, students take a variety of courses in other parts of the University, in such topic areas as computer science, English, math, history, economics, political science, sociology, and psychology.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections. Students may also elect not to specialize, but instead to span the broadest possible coverage of the field.

In the policing and security emphasis students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units. These career-oriented experiences help students to better understand the theory and research presented in their classes.

The college maintains close ties to criminal justice agencies in the community, such as the Boston Police Department and the Office of the Attorney General, and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system. In addition, the college cooperates with the mayor's office and a number of private corporations in helping to run various community-based anti-crime programs. The college faculty also has a strong voice and participates actively in research and policy-making at a national and international level. Besides a variety of major research projects, the college houses the *Journal of Quantitative Criminology*, a leading international journal of research in criminology and criminal justice.

Class Entrance Requirements

Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	1.9
To graduate	2.0

Graduation Requirements

Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.

Transfer Credit

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

Bachelor of Science Curriculum

Quarter 1	CJ 1101, Administration of Criminal Justice; HST 1101, Western Civilization to 1648; POL 1110, Introduction to Politics; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CJ 1112, Critical Issues in Criminal Justice; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and HST 1102, Western Civilization Since 1648.
Quarter 3	CJ 1151, Introduction to Law and Legal Process 1; ENG 1111, Freshman English 2; PSY 1112, Foundations of Psychology 2; and SOC 1100, Introduction to Sociology.
Quarter 4	CJ 1201, Criminology; CJ 1251, Introduction to Criminal Law; POL 1111, Introduction to American Government; and one math/science requirement.
Quarter 5	CJ 1252, Criminal Due Process; POL 1318, State and Local Government; one math/science requirement; and one non-criminal justice elective.
Quarter 6	CJ 1453, Criminal Justice Research Methods; ECN 1115, Principles of Macroeconomics; ENG 1350, Intermediate Writing; and one criminal justice elective.
Quarter 7	CJ 1454, Criminal Justice Statistics; ECN 1116, Principles of Microeconomics; one criminal justice elective; and one non-criminal justice elective.
Quarters 8–11	28 quarter hours of criminal justice electives and 36 quarter hours of non-criminal justice electives.

College of Engineering

Allen L. Soyster, PhD, *Dean*
Yaman Yener, PhD, *Associate Dean and Director, Graduate School of Engineering*
Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*
C. W. P. Finn, PhD, *Director of the School of Engineering Technology and the Lowell Institute School*
Cynthia Snow, MA, *Assistant Dean for Administration*
David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*
Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*
Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college helps students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil and environmental, electrical and computer, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. A program of study for this option is arranged on an individual basis with a faculty adviser. A set of courses related to biomedical engineering is also available.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification in an engineering discipline are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

Bachelor of Science/ Master of Science Joint Degree Program

The departments of electrical and computer engineering and mechanical, industrial, and manufacturing engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Class Entrance Requirements

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

Graduation Requirements

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university must complete at least 48 quarter hours at Northeastern University immediately preceding graduation to be eligible to receive the Bachelor of Science degree.

Bachelor of Science Curriculum for First Three Quarters

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1110, Freshman English 1; GE 1001, Introduction to Engineering; GE 1101, Engineering Problem Solving and Computation; MTH 1123, Calculus 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1111, Freshman English 2; GE 1002, Introduction to Engineering Cooperative Education; GE 1102, Engineering Problem Solving with Application Software; MTH 1124, Calculus 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1103, Engineering Design; MTH 1125, Calculus 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Fine, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors
Ronald J. Willey, PhD
John A. Williams, PhD
Donald L. Wise, PhD,
Cabot Corporation Professor of Chemical Engineering

Associate Professors
Gilda A. Barabino, PhD
Bernard M. Goodwin, ScD
Richard R. Stewart, PhD

The goal of the chemical engineering program is to offer students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new products such as wonder drugs, materials that improve life on earth, and systems that make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, but also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies that touch our lives. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge towards fully professional levels.

Bachelor of Science Curriculum

Quarters 1–3	See above. (In Quarter 3 replace PHY 1523 with CHM 1138, General Chemistry Lab.)
Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1223, Calculus 4; and one social science/humanities elective.

Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing.
Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil and Environmental Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors
Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Paul H. King, PhD

Associate Professors
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Assistant Professors
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Ajiboye F. Oluokun, PhD
Sara Wadia-Fascetti, PhD

Professor Emeritus
Kenneth M. Leet, ScD

Adjunct Professor
Sidney J. Wartel, JD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

In addition to the basic program in civil engineering, the department offers an option in environmental engineering. This option allows students who wish to specialize in environmental engineering to gain a stronger background in related environmental sciences.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams.

Bachelor of Science in Civil Engineering Curriculum

Quarters 1–3	See page 105.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1250, Steel Design 1; CIV 1310, Fluid Mechanics; and MTH 1230, Linear Algebra.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	MIM 1366, Dynamics for Civil Engineers; two technical electives; and one social science/humanities elective.
Quarter 9	CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1665, Professional Issues for Civil Engineers; MIM 1215, Engineering Economy; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

Environmental Engineering Option Curriculum

Quarters 1–3	See page 105.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	One engineering breadth elective; one environmental science elective; and two technical electives.
Quarter 9	CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1665, Professional Issues for Civil Engineers; and MIM 1215, Engineering Economy.
Quarter 10	CIV 1350, Environmental and Hydraulics Lab; one environmental science elective; one social science/humanities elective; and one general elective.
Quarter 11	CIV 1395, Environmental Design Projects; two technical electives; and one social science/humanities elective.

Electrical and Computer Engineering

John G. Proakis, PhD, *William Lincoln Smith Professor and Chair*

Professors
Soeren Buus, PhD
Chung Chan, PhD
Anthony J. Devaney, PhD
James M. Feldman, PhD
Samuel Fine, SM, MD
Arvin Grabel, ScD
Sarma S. Mulukutla, PhD
Sheila Prasad-Hinchey, PhD
Sheldon S. Sandler, PhD
Martin E. Schetzen, ScD
Philip E. Serafim, ScD
Michael B. Silevitch, PhD
Carmine Vittoria, PhD

Associate Professors
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Jill D. Crisman, PhD
Vinay Ingle, PhD
Mieczyslaw M. Kokar, PhD
Miriam Lesser, PhD
Hanoch Lev-Ari, PhD
Elias S. Manolakos, PhD
Nicol E. McGruer, PhD
Stephen W. McKnight, PhD
David J. McLaughlin, PhD
Ramachandran Raghavan, PhD
Carey M. Rappaport, ScD
Masoud Salehi, PhD
Bahram Shafai, ScD
Ioannis Stavrakakis, PhD
Gilead Tadmor, PhD
Man-Kuan Vai, PhD
Paul M. Zavracky, PhD

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Jeffrey A. Hopwood, PhD
David R. Kaeli, PhD
Bradley Lehman, PhD
Lisa McIlrath, PhD
Waleed Meleis, PhD
Eric Miller, PhD
Aleksandar M. Stankovic, PhD

Lecturers
Jack I. Hanania, PhD
Norman C. Poirier, MS
Jacob Shekel, DSc

In electrical and computer engineering, students gain the knowledge and skills to address such problems as transferring and managing information, improving industrial productivity, conserving energy, and finding alternative energy sources. Electrical engineers have had a primary role in the development of the computer, integrated circuits, the pacemaker, satellite communication, space navigation, microprocessors, television, and the means of providing energy.

Some electrical engineers work in traditional areas of system design and development; others apply their skills in areas as diverse as ocean exploration, meteorology, transportation, experimental psychology, electronic music, health care systems, bioelectronics, and the development of educational devices for individuals with special needs.

The curriculum incorporates both information sciences, which focus on systems whose function is computation, communication, or control, and energy resources, which focus on the sources, generation, and distribution of large quantities of electrical energy.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuit analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, digital signal processing, and power and energy conversion.

In addition to electrical engineering, the department offers options in computer engineering and power systems engineering. All options are based on a common core program, with a special concentration during the last two years of study. The computer engineering option allows specialization in designing and integrating digital computers within larger systems for communications, resource management, and automatic control. The power systems engineering option is conducted in cooperation with electric power companies in New England and other eastern states and allows students to specialize in energy resources.

In the cooperative work phase of the program, co-op jobs generally increase in the level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers.

Concentration in Computer Engineering

For those who wish to specialize in designing and integrating digital computers within larger systems for communications, resource management, and automatic control, this concentration offers a basic but comprehensive knowledge of the principles underlying the organization, design, and applications of digital processing systems. Both hardware and software design are covered.

Concentration in Power Systems Engineering

This concentration is designed for students who wish to specialize in energy resources. The program is conducted in cooperation with electric power companies in New England and several eastern states.

Bachelor of Science in Electrical Engineering Curriculum

Quarters 1–3	See page 105.
Quarter 4	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.

	Quarter 5	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; MIM 1245, Materials Science; MTH 1223, Calculus 4; and one social science/ humanities elective.
	Quarter 6	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ECE 1363, Electromagnetic Field Theory 1.
	Quarter 7	ECE 1332, Linear Systems 1; ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Fields Lab; and ENG 1125, Technical Writing.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; MIM 1270, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; MTH 1384, Probability; and one technical elective (level 1).
	Quarter 9	ECE 1355, Communication Systems 1; two technical electives (level 1); and one social science/humanities elective.
	Quarter 10	ECE 1501, Capstone Design 1; two technical electives (level 1 or level 2); one technical elective (level 2); and one social science/humanities elective.
	Quarter 11	ECE 1502, Capstone Design 2; two technical electives (level 2); and one social science/humanities elective.
Bachelor of Science in Electrical Engineering, Computer Engineering Concentration Curriculum	Quarters 1–3	See page 105.
	Quarters 4–7	Same as electrical engineering.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1383, Computer Engineering 3 and ECE 1238, Microprocessor Laboratory; MIM 1245, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; and MTH 1384, Probability.
	Quarter 9	ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab; ECE 1355, Communication Systems 1; one technical elective (level 1); and one social science/humanities elective.
	Quarter 10	ECE 1384, Computer Engineering 4; ECE 1501, Capstone Design 1; one technical elective (level 1); one technical elective (level 1 or 2); and one social science/humanities elective.
	Quarter 11	ECE 1502, Capstone Design 2; one technical elective (level 1 or 2); one technical elective (level 2); and one social science/humanities elective.
Bachelor of Science in Electrical Engineering, Power Systems Engineering Concentration Curriculum	Quarters 1–3	See page 105.
	Quarters 4–7	Same as electrical engineering.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1370, Electric Energy Devices and ECE 1228, Energy Devices Lab; MIM 1245, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; and MTH 1384, Probability.
	Quarter 9 (Spring only)	ECE 1355, Communication Systems 1; ECE 1371, Electric Drives and Motion Systems and ECE 1232, Electric Machines Lab; ECE 1471, Elements of Power Systems; and one social science/humanities elective.
	Quarter 10 (Winter only)	ECE 1472, Power Systems Analysis and ECE 1231, Power Systems Lab; ECE 1501, Capstone Design 1; one technical elective (level 1); one technical elective (level 1 or 2); and one social science/humanities elective.
	Quarter 11 (Spring only)	ECE 1379, Analysis of Electrical Transients; ECE 1474, Power Electronics; ECE 1502, Capstone Design 2; and one social science/humanities elective.

General Engineering

Advisory Committee
Richard R. Stewart, PhD, *Chemical Engineering, Chair*
Peter Furth, PhD, *Civil and Environmental Engineering*
Arvin Grabel, ScD, *Electrical Engineering*
Ronald F. Perry, PhD, *Industrial Engineering*
Mohamad Metghalchi, ScD, *Mechanical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering.

Bachelor of Science Curriculum

Quarters 1–3	See page 105. (Replace CHM 1131 and CHM 1132 with social science/humanities electives.)
Quarter 4	MTH 1223, Calculus 4; one basic science elective; one engineering science elective; and one social science/humanities elective.
Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.
Quarter 6	ENG 1340, Writing Workshop 1; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Mechanical, Industrial, and Manufacturing Engineering

John W. Cipolla, Jr., PhD, *Donald W. Smith Professor of Engineering and Chair*

Professors
George G. Adams, PhD
Thomas P. Cullinane, PhD
Alexander M. Gorlov, PhD
Ronald R. Mourant, PhD
Richard J. Murphy, PhD
Hamid Nayeb-Hashemi, PhD
John N. Rossettos, PhD
Allen L. Soyster, PhD
Mohammad E. Taslim, PhD
Yaman Yener, PhD
Ibrahim Zeid, PhD

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Nasser Fard, PhD
Surendra M. Gupta, PhD
Olusegun J. Ilegbusi, PhD
Gregory J. Kowalski, PhD
Yiannis A. Levendis, PhD
Emanuel S. Melachrinoudis, PhD
Achille Messac, PhD
Mohamad Metghalchi, ScD
Uichiro Narusawa, PhD
Ronald F. Perry, PhD
Gerard Voland, PhD

Assistant Professors
Mary E. Helander, PhD
Jacqueline A. Isaacs, PhD
Sagar V. Kamarthi, PhD
Mary Grace Williams, PhD
Bruce Wilson, PhD

Professors Emeriti
Charles A. Berg, ScD
Ralph S. Blanchard, MS
Arthur R. Foster, MEngr
Thomas E. Hulbert, MS
Bertram S. Long, MEngr
Alvin J. Yorra, MS
John Zotos, MEngr

Senior Research Engineer
Joseph T. Blucher, PhD

The Department of Mechanical, Industrial, and Manufacturing Engineering offers two accredited programs leading to a Bachelor of Science in Industrial Engineering and a Bachelor of Science in Mechanical Engineering.

Industrial Engineering

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise.

The program in industrial engineering offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering workstations by the senior year.

Bachelor of Science in Industrial Engineering Curriculum

Quarters 1–3	See page 105.
Quarter 4	ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics; MIM 1240, Materials Science; MIM 1280, Thermodynamics 1; and MTH 1223, Calculus for Engineering Majors 4.
Quarter 5	MIM 1212, Probabilistic Analysis for Engineers; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics; MIM 1420, Computers and Information Systems; and MIM 1320, Work Design.
Quarter 7	MIM 1312, Statistics; MIM 1325, Operations Research 1; one technical elective; and one social science/humanities elective.
Quarter 8	ECE 1171, Electrical Engineering 1; MIM 1430, Manufacturing Systems and Techniques; MIM 1522, Human-Machine Systems; and one social science/humanities elective.
Quarter 9	ENG 1125, Technical Writing; MIM 1410, Digital Simulation Techniques; MIM 1425, Operations Research 2; and one open elective.
Quarter 10	MIM 1501, Design Project 1; MIM 1510, Production and Inventory Control; MIM 1516, Quality Assurance; and one technical elective.
Quarter 11	MIM 1502, Design Project 2; two technical electives; and one social science/humanities elective.

Mechanical Engineering

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment.

Bachelor of Science in Mechanical Engineering Curriculum

Quarters 1–3	See page 105.
Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; MIM 1240, Materials Science; MIM 1280, Thermodynamics 1; and MTH 1223, Calculus for Engineering Majors 4.
Quarter 5	MIM 1212, Probabilistic Analysis for Engineers; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ENG 1340, Writing Workshop; MIM 1300, Measurement and Analysis; MIM 1355, Strength of Materials 1; MIM 1375, Fluid Mechanics; and MTH 1230, Linear Algebra.
Quarter 7	MIM 1356, Strength of Materials 2; MIM 1360, Dynamics; MIM 1370, Heat Transfer; and MIM 1380, Thermodynamics 2.
Quarter 8	MIM 1400, Mechanical Engineering Computation and Interpretation; MIM 1445, Materials Processing *or* ECE 1171, Electrical Engineering 1; MIM 1450, Mechanical Design; and one social science/humanities elective.
Quarter 9	MIM 1440, Mechanical Behavior of Materials *or* ECE 1171, Electrical Engineering 1; MIM 1455, Mechanical Vibrations; MIM 1475, Thermal Design; and one social science/humanities elective.
Quarter 10	MIM 1501, Design Project 1; two technical electives; and one social science elective.
Quarter 11	MIM 1502, Design Project 2; two technical electives; and one social science/ humanities elective.

Part-Time Evening Engineering

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil and environmental, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact 220 Snell, 373-2185. The program coordinator is Caryn Vigoda, MEd.

Part-Time Evening Curriculum for Bachelor of Science

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1101, Problem Solving and Computation and MTH 1123, Calculus 1.
	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1124, Calculus 2.
	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1125, Calculus 3.
Second Year	Fall Quarter	MTH 1223, Calculus 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
	Winter Quarter	MTH 1225, Differential Equations (Engineering) 1; and PHY 1222, Physics 2.
	Spring Quarter	GE 1103, Engineering Design; PHY 1223, Physics 3; and PHY 1523, Physics 3 Lab.

Part-Time Evening Curriculum for Bachelor of Science in Civil and Environmental Engineering

Third Year	Fall Quarter	CIV 1210, Structural Mechanics 1; and CIV 1620, Engineering Measurements *or* CIV 1340, Environmental Engineering 1.
	Winter Quarter	CIV 1211, Structural Mechanics 2; MIM 1366, Dynamics for Civil Engineers *or* CIV 1510, Materials; and CIV 1511, Materials Laboratory.
	Spring Quarter	CIV 1220, Structural Analysis 1; CIV 1410, Soil Mechanics; and CIV 1411, Soil Mechanics Laboratory *or* CIV 1640, Applied Probability Theory for Civil Engineers.
Fourth Year	Fall Quarter	CIV 1310, Fluid Mechanics; CIV 1340, Environmental Engineering 1 *or* CIV 1620, Engineering Measurements.

		Winter Quarter	MIM 1366, Dynamics for Civil Engineers *or* CIV 1510, Materials; CIV 1511, Materials Laboratory; and MTH 1230, Linear Algebra.
		Spring Quarter	CIV 1240, Concrete Design 1; CIV 1640, Applied Probability Theory for Civil Engineers *or* CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab.
Environmental Concentration	Fifth and Sixth Years	CIV 1222, Structural Analysis 2; CIV 1226, Structural Analysis and Design Laboratory; CIV 1241, Concrete Design 2; CIV 1250, Steel Design 1; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental and Hydraulics Design Laboratory; CIV 1395, Environmental Design Projects; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; MIM 1215, Engineering Economy; MIM 1270, Thermodynamics; and a general elective.	
Structural Concentration	Fifth and Sixth Years	CIV 1222, Structural Analysis 2; CIV 1226, Structural Analysis and Design Laboratory; CIV 1241, Concrete Design 2; CIV 1250, Steel Design 1; CIV 1295, Structural Design Project; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; MIM 1215, Engineering Economy; MIM 1270, Thermodynamics; ECE 1171, Electrical Engineering 1; and a general elective.	
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
Part-Time Evening Curriculum for Bachelor of Science in Electrical Engineering	Third Year	Fall Quarter	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; and PHY 1224, Physics 4.
		Winter Quarter	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; and MIM 1245, Materials Science.
		Spring Quarter	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1.
	Fourth Year	Fall Quarter	ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab.
		Winter Quarter	ECE 1332, Linear Systems 1; and MIM 1364, Mechanics for Electrical Engineers *or* MIM 1270, Thermodynamics.
		Spring Quarter	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; and MTH 1384, Probability.
	Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1; and one technical elective (level 1).
		Winter Quarter	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab; and one technical elective (level 1).
		Spring Quarter	ECE 1355, Communication Systems 1; and one technical elective (level 1).
	Sixth Year	Fall Quarter	One technical elective (level 1 or 2); and one technical elective (level 2).
		Winter Quarter	ECE 1501, Capstone Design 1; one technical elective (level 1 or 2); and one technical elective (level 2).
		Spring Quarter	ECE 1502, Capstone Design 2; and one technical elective (level 2).
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; five adviser-approved social science/humanities electives; and ENG 1125, Technical Writing.

Computer Engineering Concentration			Required technical electives: ECE 1383, Computer Engineering 3 (level 1) and ECE 1238, Microprocessor Laboratory; ECE 1384, Computer Engineering 4 (level 2); and ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab (level 2).
Part-Time Evening Curriculum for Bachelor of Science in Mechanical Engineering	Third Year	Fall Quarter	MIM 1250, Engineering Mechanics and MIM 1280, Thermodynamics 1
		Winter Quarter	MIM 1300, Measurement and Analysis; MTH 1230, Linear Algebra; and ENG 1340, Writing Workshop.
		Spring Quarter	MIM 1360, Dynamics and MIM 1380, Thermodynamics 2.
	Fourth Year	Fall Quarter	MIM 1355, Strength of Materials 1 and MIM 1375, Fluid Mechanics.
		Winter Quarter	MIM 1356, Strength of Materials 2 and MIM 1370, Heat Transfer.
		Spring Quarter	MIM 1212, Probabilistic Analysis for Engineers and MIM 1240, Materials Science.
	Fifth Year	Fall Quarter	MIM 1400, Mechanical Engineering Computation and Interpretation and MIM 1450, Mechanical Design.
		Winter Quarter	MIM 1475, Thermal Design and MIM 1501, Design Project 1.
		Spring Quarter	MIM 1502, Design Project 2 and one materials elective.
		Summer Quarter	An additional MIM technical elective is required in the summer following the fifth year.
	Sixth Year	Fall Quarter	ECE 1171, Electrical Engineering 1 and one technical elective.
		Winter Quarter	MIM 1215, Engineering Economy; and one technical elective.
		Spring Quarter	MIM 1455, Mechanical Vibrations and one technical elective.
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, Freshman English 1; ENG 1111, Freshman English 2; ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; and four adviser-approved social science/humanities electives.

School of Engineering Technology

C. W. P. Finn, PhD, *Director*
Roy Dalsheim, MEd, *Assistant Director*
Rasma Galins, *Assistant Director*

Professor
Samuel Fine, MD
Electrical Engineering Technology

Associate Professors
William E. Cole, PhD
Mechanical Engineering Technology
David S. Goldman, MS, PE
Computer Technology
Eric W. Hansberry, MS
Design Graphics
George F. Kent, MS, MBA, PE
Mechanical Engineering Technology

Associate Academic Specialist
Leonard F. Dow, MS
Electrical Engineering Technology

Lecturer
Jerome Tapper, BS, PE
Electrical Engineering Technology
Joel R. Weinstein, BS
Computer Technology

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

Part-Time Evening and Weekend Programs

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-373-2500 (voice), 617-373-8526 (TTY), or 617-373-2501 (FAX).

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.7
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, refer to the School of Engineering Technology bulletin, available at 120 Snell Engineering Center.

Minor in Computer Technology

To qualify for a minor in computer technology, the student must complete the following six courses and one laboratory. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: CT 1311, "C" Language; CT 1330, Data Structures; CT 1345, Assembly Language; CT 1340, Software Engineering; CT 1381, Operating Systems; CT 1393, UNIX.

Minor in Electrical Engineering Technology

To qualify for a minor in electrical engineering technology, the student must complete the following five courses and three laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: EET 1151, Circuit Analysis 1; EET 1152, Circuit Analysis 2; EET 1324, Circuit Lab 1; EET 1325, Circuit Lab 2; EET 1311, Digital Electronics 1; EET 1312, Analog Electronics 1; EET 1323, Electronics Lab; EET 1330, Energy Conversion; or EET 1377, Control Engineering 1.

Minor in Mechanical Engineering Technology

To qualify for a minor in mechanical engineering technology, the student must complete the following six courses and two laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: MET 1301, Mechanics A; MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1370, Fluid Mechanics A; MET 1388, Measurements and Analysis; MET 1340, Thermodynamics A; MET 1380, Materials A; MET 1391, Tech Lab A.

To obtain credit for a minor in engineering technology, students must file a petition form with the School of Engineering Technology in 120 Snell Engineering Center. Interested students should confer with an adviser as soon as possible. Advisers are Director C. W. P. Finn and Mr. Roy Dalsheim, 120 Snell, 617-373-2500.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School or Embry Riddle, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets.

Bachelor of Science Curriculum

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, Freshman English 1; GET 1105, Computer Applications for Tech; and MTH 1194, Calculus 2.
Quarter 2	ENG 1111, Freshman English 2; GET 1170, Engineering Graphics 1; PHY 1191, Physics for BSET 1; PHY 1196, Physics BSET Laboratory 1; and one liberal arts elective.

Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1195, Calculus 3; PHY 1192, Physics for BSET 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	EET 1320, Electricity and Electronics 1; GET 1104, Introduction to Product Design; MET 1301, Mechanics A; PHY 1198, Physics BSET Laboratory 3; and one liberal arts elective.
Quarter 5	MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1373, Fluid Mechanics; and one liberal arts elective.
Quarter 6	ENG 1125, Technical Writing; MET 1340, Thermodynamics A; MET 1380, Mechanical A; and MET 1388, Measurement and Analysis.
Quarter 7	MET 1333, Design Lab; MET 1381, Mechanical Design B; one technical elective; and two liberal arts electives.

Computer Technology

Leonard F. Dow, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for technical inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1102, Introduction to Engineering Technology; GET 1105, Computers Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, Freshman English 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1196, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	CT 1150, Computer Organization; GET 1100, Computer Programming for Engineering Technology; MTH 1194, Calculus 2; PHY 1193, Physics for BSET 3; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	CT 1311, Programming with C++ Language; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1195, Calculus 3.
Quarter 6	CT 1330, Data Structures; CT 1335, Numerical Methods; EET 1152, Circuit Analysis 2; and EET 1311, Digital Electronics 1.
Quarter 7	CT 1340, Software Engineering Design; CT 1381, Operating Systems; ENG 1125, Technical Writing; and one liberal arts elective.
Quarter 8	CT 1345, Assembly Language; CT 1346, Assembly Language Lab; CT 1374, Introduction to CPU Hardware; CT 1380, Data Communications; and one liberal arts elective.

Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1369, Computer Logic; CT 1370, Computer Laboratory 1; CT 1375, CPU Architecture; and CT 1480, Local Area Networks 1.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; CT 1371, Computer Laboratory 2; one technical elective; and one liberal arts elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; CT 1372, Computer Laboratory 3; one technical elective; and one liberal arts elective.

Electrical Engineering Technology

Leonard F. Dow, MS, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1102, Introduction to Engineering Technology; GET 1105, Computer Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, Freshman English 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1196, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics for BSET 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	EET 1151, Circuit Analysis 1; GET 1100, Computer Programming for Engineering Technology; MTH 1194, Calculus 2; PHY 1193, Physics for BSET 3; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	EET 1152, Circuit Analysis 2; EET 1324, Circuits Laboratory 1; MET 1319, Mechanics; MTH 1195, Calculus 3; and one liberal arts elective.
Quarter 6	EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1312, Analog Electronics 1; EET 1325, Circuit Laboratory 2; and EET 1360, Engineering Analysis.
Quarter 7	EET 1313, Analog Electronics 2; EET 1314, Digital Electronics 2; EET 1323, Electronics Lab; EET 1354, Circuit Analysis 4; and ENG 1125, Technical Writing.
Quarter 8	EET 1310, Electrical Measurements; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one liberal arts elective.
Quarter 9	ECN 1115, Principles of Macroeconomics; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one liberal arts elective.
Quarter 10	EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; one technical elective; and one liberal arts elective.
Quarter 11	EET 1329, Advanced Electronics Laboratory 3; EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; and one liberal arts elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1102, Introduction to Engineering Technology; GET 1105, Computer Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, Freshman English 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1996, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics for BSET 2; and PHY 1997, Physics BSET Laboratory 2.
Quarter 4	EET 1320, Electricity and Electronics; GET 1104, Introduction to Product Design; MET 1301, Mechanics A; MTH 1194, Calculus 2; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1380, Materials A; and MTH 1195, Calculus 3.
Quarter 6	ENG 1125, Technical Writing; MET 1314, Stress Analysis A; MET 1340, Thermodynamics A; and MET 1388, Measurement and Analysis.
Quarter 7	ECN 1115, Principles of Macroeconomics; GET 1200, Visual Basics; MET 1303, Mechanics C; MET 1315, Stress Analysis B; and MET 1391, Technology Laboratory A.
Quarter 8	MET 1341, Thermodynamics B; MET 1393, Technology Laboratory C; MET 1396, Machine Shop; one technical elective; and one liberal arts elective.
Quarter 9	GET 1356, Engineering Economy; MET 1373, Fluid Mechanics; MET 1392, Technology Laboratory B; one technical elective; and one liberal arts elective.
Quarter 10	MET 1330, Mechanical Design A; MET 1343, Heat Transfer; one technical elective; and one liberal arts elective.
Quarter 11	MET 1331, Mechanical Design B; MET 1333, Design Lab; one liberal arts elective; and one open elective.

College of Nursing

Eileen H. Zungolo, MEd, EdD, RN, *Dean*
Carole A. Shea, MS, PhD, RN, CS, FAAN, *Associate Dean and Director of Graduate School*
Janet A. Carroll, MS, RN, *Assistant Dean of Administration*
Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*

Associate Professors
Jane F. Aroian, MSN, EdD, RN
Olivia M. Breton, MEd, RN
Margery M. Chisholm, MS, EdD, RN, CS
Mary Anne Gauthier, MSN, EdD, RN
Patricia J. Hollen, MS, PhD, RN
Dorett Hope, MSEd, EdD
Elizabeth M. Howard, MS, PhD, RN, ANP
M. Marcia Lynch, MSN, DNSc, RN
Geraldine A. Medici, MS, RN
Patricia Maguire Meservey, MS, PhD, RN
Carol A. Patsdaughter, MSN, PhD, RN
Susan J. Roberts, MS, DNSc, RN, ANP
Mary Suzanne Tarmina, MS, PhD, RN, FNP
Mary E. Wilcox, MS, RN
M. Delaine Williamson, MS, MPH, RD
Rachel Zachariah, DNSc, MS, RN

Assistant Professors
Anne Bateman, MSN, PhD, RN
Michelle Beauchesne, MS, DNSc, RN, PNP
Rosanna DeMarco, MS, PhD, RN
Carol Glod, MS, PhD, RN, CS
Cecilia G. Grindel, MSN, PhD, RN
Barbara Kelley, MS, MPS, EdD, RN, PNP
Margaret A. Mahoney, MS, PhD, RN
Peggy Matteson, MS, PhD, RN
Kathleen Miller, MS, EdD, AN, ANP
Abraham N. Ndiwane, MS, EdD, RN
Pamela Whitting, MS, RN

Lecturers
Carolyn O'Brien, MS, RN, ANP
Frank R. Palin, MSN, RN, PNP

The College of Nursing offers a Bachelor of Science program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, community health centers, schools, and homes. The college aims to provide all students—including those with diverse backgrounds and changing career goals—with a broad-based education which will foster ongoing personal and professional growth.

Nursing is both a science-based process and a caring art. The curriculum offers instruction in the sciences with opportunities in the humanities. Since nursing practice focuses on promoting, preserving, and restoring the health and well-being of individuals, families, groups, and communities across the life span, the curriculum emphasizes a community-based primary care approach, which starts in the freshman year and builds throughout the program. This approach requires knowledge, skills, and attitudes related to health care that are comprehensive, culturally sensitive, continuous, effective, compassionate, and collaborative. Because the vast majority of people's lives are spent in the community, a significant part of the clinical program takes place in the community where people live, work, eat, rest, play, vote, and pray. Recognizing the equally important need to prepare nurses to care for ill clients in institutions, the program provides ample opportunities for nursing practice in hospitals, rehabilitation centers, and long-term care facilities. The curriculum is capped by courses that enable students to put leadership and management skills into action, and to synthesize the complete role of the professional nurse in a clinical practicum.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives them the opportunity to integrate the theory and practice of nursing in selected settings. Through more than seventy community and institutional health-care agencies in Greater Boston, and across the country, students gain experience in providing nursing care to a variety of clients and families. Students learn that nurses have major roles in wellness and health promotion, acute care, and long-term care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows our graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The college subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

Class Entrance Requirements

The requirements listed are for the Class of 1996 and beyond. Students completing the nursing program prior to 1996 were strongly encouraged to meet these academic standards. The minimum overall quality-point averages (QPA) listed are required at year's end for students to advance to the next level or to graduate.

Freshman	1.6
Sophomore	2.0
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

These averages reflect the minimum requirements for advancement; the faculty of the college highly recommends that students achieve higher grades in order to avoid academic difficulties as they progress through the program.

In addition, a grade of 2.0 or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1162, BIO 1163, and BIO 1164. The QPA for these science courses must be 2.0 before a student can enter the sophomore year. Other standards for progress, such as the minimum science QPA for the sophomore year, are published in the *College of Nursing Undergraduate Student Handbook* available at 211 Robinson Hall.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titre and immunization for measles, mumps, rubella, and tetanus. Hepatitis B, PPD, and a chicken pox titre are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the approved school uniform in some clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the clinical courses must have access to a car to travel to assigned agencies.

Graduation Requirements

The College of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. The faculty has designed a curriculum to prepare nursing students for health care practice that addresses common goals to improve our nation's health. Degree candidates must complete all prescribed courses, a minimum of 179 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the college are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Nursing. Degree requirements and the year of graduation for a student who does not make academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The College of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 60 quarter hours of transfer credits that are appropriate to curriculum requirements. These credits must include two anatomy and physiology courses (with labs) and one chemistry course (with lab) and reflect a minimum overall QPA of 2.5. A microbiology course (with lab) is strongly recommended. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of two quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and six months.

RN to BSN Option

The college accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree into the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through the development of a portfolio to validate prior learning. The RN to BSN curriculum option has been revised to reflect the need for community-based primary care learning experiences with emphasis on management and leadership. Students entering the program in fall 1997 will participate in course offerings and program requirements that are designed to increase flexibility and facilitate learning for working nurses.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Anatomy and Physiology 1; BIO 1652, Anatomy and Physiology 1 Lab; ENG 1110, Freshman English 1; MTH 1101, Applications of Algebra; and one computer elective.
Quarter 2	BIO 1163, Integrated Anatomy and Physiology 2; BIO 1653, Anatomy and Physiology 2 Lab; ENG 1111, Freshman English 2; PSY 1111, Foundations of Psychology 1; and NUR 1110, Nursing Health Assessment.

Quarter 3	BIO 1164, Integrated Anatomy and Physiology 3; BIO 1654, Anatomy and Physiology 3 Lab; PSY 1271, Social Psychology; NUR 1102, Introduction to Human Nutrition; NUR 1107, Nursing Process and Skills; and COP 1370, Introduction to Career Management.
Quarter 4	BIO 1122, Basic Microbiology; BIO 1162, Basic Microbiology Lab; SOC 1100, Introduction to Sociology; and NUR 1206, Promoting Healthy Childbearing and Childrearing.
Quarter 5	CHM 1107, General Chemistry for Health Professionals 2; NUR 1202, Pathophysiological Concepts for Clinical Nursing; and NUR 1208, Promoting Healthy Adulthood and Aging.
Quarter 6	NUR 1307, Influences of Health and Disease; NUR 1308, Promoting Health Restoration in Adults; and PCL 1306, Pharmacodynamics 1.
Quarter 7	ENG 1350, Intermediate Writing; NUR 1306, Promoting Health Restoration in Children; and PCL 1307, Pharmacodynamics 2.
Quarter 8	NUR 1408, Promoting Mental Health; PHL 1165, Moral Problems in Medicine; and SOC 1320 Introduction to Statistical Analysis 1.
Quarter 9	ECN 1130, Medical Economics; NUR 1406, Promoting Healthy Communities; and NUR 1502, Introduction to Research in Nursing.
Quarter 10	NUR 1508, Management and Leading in Nursing; one humanities elective; one general elective; and one history elective.
Quarter 11	NUR 1507, Comprehensive Nursing Practicum; and two general electives.

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Independent Study; The Nurse Entrepreneur; Wellness; and Women's Health Choices and Decisions.

School of General Studies

The School of General Studies (SGS) is designed for students who need help in strengthening their basic skills while they take the required freshman-year coursework in English, mathematics, and social sciences.

The program carefully monitors student participation in small classes that are based on supportive group-learning procedures. The program also provides participants with help in clarifying their academic and career goals.

Through the combination of a carefully prescribed curriculum and the attention of faculty whose expertise is in developmental education, students follow a program that fits their individual needs. These same faculty teach the majority of the courses taken by SGS students, provide advice and support, and participate in a "House Plan" in which faculty members share information on each student's progress.

The program not only helps SGS students in their ability to do college-level work, but also allows them to consider several different areas of study before selecting a major. Students in this school are considered regular degree candidates with an undeclared major and can enter a number of majors in the University's day colleges as sophomores.

In preparation for gaining sophomore status, SGS students follow one of four curriculum tracks: arts and sciences *or* undecided, business, criminal justice, and health/science. Students may change either their intended major or curriculum track through the winter quarter of the freshman year without falling behind.

Students have access to all physical education facilities and co-curricular programs, and they are encouraged to make extensive use of the SGS Peer Tutoring Program, the Academic Assistance Center, and the math and writing centers. As for all Northeastern students, the Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, SGS students must earn a quality-point average of 2.0 or higher and successfully complete a minimum of forty-four programmed credits, as well as required courses. The College of Business Administration requires students to earn at least a 1.8 in the four core courses: ECN 4601, ENG 4014, MGT 4110, and MTH 4040.

For entrance to the College of Nursing, College of Computer Science, and School of Engineering Technology, students complete a few additional science requirements during the freshman year. The Bouvé College of Pharmacy and Health Sciences offers the following programs to students who have successfully completed the appropriate SGS curriculum: cardiopulmonary sciences, medical laboratory science, speech-language pathology and audiology, and toxicology. Students may also continue their degree programs in University College.

SGS students who do not meet the requirements for sophomore status in their intended majors may be eligible to return as "repeating" or "continuing" freshmen and satisfy specific requirements to complete the freshman year in their particular program.

Tuition and Fees

Tuition and fees for the School of General Studies are the same as for students in the full-time day programs.

Business Track

Quarter 1	ED 4003, Integrated Language Skills; ENG 4013, Fundamentals of English 1; HST 4110, History of Civilization A *or* ECN 4601, Economics 1; and MTH 4010, Mathematical Preliminaries 2.*
Quarter 2	ED 4004, Integrated Language Skills; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A *or* MGT 1115, Introduction to Business; and MTH 4020, Functions and Algebra.*
Quarter 3	ED 4005, Integrated Language Skills Seminar; ECN 4601, Economics 1; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 4040, College Mathematics for Business*; and a directed elective *or* ENG 1111, Freshman English 2.

Arts and Sciences, Criminal Justice, or Undecided Track	Quarter 1	ED 4003, Integrated Language Skills; ENG 4013, Fundamentals of English 1; MTH 4000, Mathematical Preliminaries 1*; and SOC 4010, Principles of Sociology 1 *or* HST 4110, History of Civilization A.
	Quarter 2	ED 4004, Integrated Language Skills; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A *or* SOC 4010, Principles of Sociology 1; and MTH 4010, Mathematical Preliminaries 2.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; ENG 1111, Freshman English 2; HST 4111, History of Civilization B; MTH 4020, Functions and Algebra;* and SOC 4011, Principles of Sociology 2; *or* an elective.
Health Sciences Track	Quarter 1	CHM 1110, General Chemistry Preliminaries; ED 4003, Integrated Language Skills; ENG 4013, Fundamentals of English 1; and MTH 4010, Mathematical Preliminaries 2.*
	Quarter 2	CHM 1111, General Chemistry 1; ED 4004, Integrated Language Skills; ENG 4014, Fundamentals of English 2; and MTH 4020, Functions and Algebra.*
	Quarter 3	BIO 1140, Basic Animal Biology 1; ED 4005, Integrated Language Skills Seminar; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus;* and SOC 4010, Principles of Sociology 1.

*In each curriculum, students will be placed in a mathematics course based on testing results.

Course Descriptions

Arts and Sciences

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 33.

African-American Studies

AFR 1100 Introduction to African-American Studies **4 QH**
Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1121/ENG 1678 Early African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

AFR 1131/HST 1525 African-American History 1 **4 QH**
Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. (Core Category III)

AFR 1132/HST 1526 African-American History 2 **4 QH**
Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. *Prereq. AFR 1131 or permission of instructor.*

AFR 1133 History of Blacks in the Media and the Press **4 QH**
Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Educational Issues and Minority Communities 1 **4 QH**
Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1151/ART 1218 African-American Art History **4 QH**
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America. (Core Category II)

AFR 1153/MUS 1104 Survey of African-American Music **4 Q**
Studies the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties, bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included.

AFR 1155 Foundations of Black Culture **4 Q**
Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples.

AFR 1156/MUS 1181 Music of Africa **4 Q**
Provides a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style will all be discussed in light of possible contributions to contemporary African-American music.

AFR 1161/ECN 1170 Economic Issues in Minority Communities **4 Q**
Examines minority life-styles, perspectives, self-images and soci position in the urban community, particularly in terms of the application of basic economic theories to the economic realities of minority communities. (Core Category VI)

AFR 1171 Contemporary Black Politics **4 Q**
Analyzes the evolution of black political thought in America and examines the socio-political contests that have served as catalysts to modern black political movements.

AFR 1191/HST 1620 Early African Civilization **4 Q**
Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, Nubia, Egypt, Ethiopia, and the Congo Kingdom.

AFR 1193 Africa Today **4 Q**
Studies the complex political and social picture of Africa. This course examines some of the salient features of black art, politics and identity in Africa.

AFR 1195 Identity and Nationalism in Africa **4 Q**
Studies how centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry betweer factions have affected the present identities and nationalist move ments in Africa. This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean **4 Q**
Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues will be addressed.

AFR 1197/HST 1621 Modern African Civilization **4 QH**
Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. (Core Category IV)

AFR 1200/ART 1216 Survey of African Art **4 QH**
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critiques, discussions, fieldwork, and hands-on interaction with art objects.

AFR 1211 African-Americans in Science, Technology, and Medicine **4 QH**
Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1220 The Black Novel **4 QH**
Focuses on the black novelist's place in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1223/MUS 1265 Jazz Improvisation 1 **4 QH**
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

AFR 1231/LIN 1231 African-American English **4 QH**
Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.

AFR 1234/MUS 1234 Jazz Ensemble **1 QH**
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American musics. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

AFR 1235 Black History of Boston **4 QH**
Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society **4 QH**
Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience. (Core Category VI)

AFR 1241 The Black Family **4 QH**
Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America **4 QH**
Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1249 Black Community and Social Change **4 QH**
Explores the dynamic changes experienced by black communities in the United States since the Civil Rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social change in addressing the current search for policies and programs for community development.

AFR 1251 Survey of Black Theater and Drama **4 QH**
Focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance. Same as THE 1118.

AFR 1271/POL 1308 The Politics of Poverty **4 QH**
Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

AFR 1280/PSY 1280 Black Psychological Identity **4 QH**
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology.

AFR 1294 Third World Politics **4 QH**
Offers a comparative regional analysis of the political systems of third world nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1295 Politics of South Africa **4 QH**
Examines contemporary political developments in South Africa. Focuses on the historical development of the system of racism called apartheid and the liberation movements, and the struggle for a democratic South Africa. Explores the role of the United Nations, the Organization of African Unity, the United States, and other international organizations and countries.

AFR 1297/HST 1605 Caribbean History **4 QH**
Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918-1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study **4 QH each**
Offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1342/POL 1342 Government and Politics of Africa **4 QH**
Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. (Core Category VI)

AFR 1350 Research Seminar **4 QH**
Provides students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Advanced Seminar **4 QH**
Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. The senior thesis is required of all African-American Studies majors. *Prereq. Permission of instructor.*

AFR 1380 Junior/Senior Honors Program **4 QH**
For details contact the honors office.

AFR 1401 History of East Africa **4 QH**
Deals with the precolonial period and the problems of the partition of Africa in the first section of the course. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403/HST 1623 History of West Africa **4 QH**
Studies the history of West Africa and its struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa.

AFR 1405/HST 1625 History of South Africa **4 QH**
Studies pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. (Core Category VI) *Prereq. AFR 1491 or permission of instructor.*

AFR 1415/LIN 1415 African Language **4 QH**
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

AFR 1421 African-American Literature 2 **4 QH**
Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq. AFR 1127 or permission of instructor.*

AFR 1451/MUS 1112 Jazz **4 QH**
Examines the evolution of the creative improvisational musical styles commonly called jazz, from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

AFR 1470 Black Political Thought **4 QH**
Examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1575/PSY 1575 Community Psychology Laboratory **4 QH**
Students reflect upon real-world obstacles in conducting independent field research in communities in and around Northeastern during the quarter. Student reflections are used to guide research design, to evaluate theory, and to problem-solve social problems. Research topics may focus on battered women, HIV, student stress, perceptions of the media, church involvement in dealing with stress, or topics affecting large minority populations. Evaluates student performance through class discussions and written research reports.

AFR 1810, 1811,1812,1813 Junior/Senior Honors Project **4 QH each**
For details contact the honors office.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy

PHL 1140 Social and Political Philosophy

PHL 1243 Existentialism

PHL 1335 Moral Philosophy

POL 1303 Political Behavior

POL 1362 Civil Liberties

POL 1386 International Law

SOA 1345 People in Cities

SOC 1147 Urban Social Problems

SOC 1170 Race and Ethnic Relations

SOC 1310 Class, Power, and Social Change

American Sign Language–English Interpreting

ASL 1101 American Sign Language 1 **4 QH**
Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, nonmanual aspects of ASL, introductory fingerspelling, and some cultural features of the Deaf community.

ASL 1102 American Sign Language 2 **4 QH**
Continues basic language and culture study. Offers an opportunity to build receptive and expressive ASL vocabulary. Topics include the use of signing space; and further use of nonmanual components, including facial expression and body postures. *Prereq. ASL 1101, or permission of instructor.*

ASL 1201 Intermediate American Sign Language 1 **4 QH**
Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the Deaf community. *Prereq. ASL 1102, or permission of instructor.*

ASL 1202 Intermediate American Sign Language 2 **4 QH**
Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq. ASL 1201, or permission of instructor.*

ASL 1211 Deaf Culture **4 QH**
Focuses on the status of Deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the Deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the Deaf community. *Prereq. ASL 1201, or permission of instructor.*

ASL 1212 Deaf History **4 QH**
Surveys the history of Deaf people in the Western world, with emphasis on the American Deaf community, their language, education, and relationship to hearing society. *Prereq. ASL 1101, or permission of instructor.*

ASL 1250/LIN 1250 Linguistics of American Sign Language **4 QH**
Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq. ENG 1118, and the ability to follow lectures in ASL.*

ASL 1301 Advanced American Sign Language Proficiency **4 QH**
Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in Deaf culture, society, and current affairs. *Prereq. ASL 1202, or permission of instructor.*

ASL 1302 Advanced American Sign Language Proficiency 2 **4 QH**
Continues ASL 1301. *Prereq. ASL 1301 or permission of instructor.*

ASL 1401 American Sign Language Literature **4 QH**
Examines and discusses various genres of American Sign Language. This course will concentrate on the work of current, recognized narrators in both literary and face-to-face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, Hotchkiss, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq. ASL 1202 or permission of instructor.*

ASL 1500 Introduction to Interpreting **4 QH**
Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq. or concurrent: ASL 1211 and ASL 1301. Majors only or permission of instructor.*

ASL 1505 ASL–English Interpreting 1 **4 QH**
Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq. ASL 1302 with a grade of B or better and ASL 1500. Majors only or permission of instructor.*

ASL 1506 ASL–English Interpreting 2 **4 QH**
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq. ASL 1505 with a grade of B or better. Majors only or permission of instructor.*

ASL 1507 ASL–English Interpreting 3 **4 QH**
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq. ASL 1506 with a grade of B or better. Majors only or permission of instructor.*

ASL 1520 Interpreter Role and Ethics **4 QH**
Explores ethical standards and dilemmas in ASL–English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq. ASL 1500. Majors only or permission of instructor.*

ASL 1521 Contrastive Analysis **4 QH**
Examines and contrasts the major linguistic features of ASL and English. The standard division of morphology, phonology, syntax, semantics, and register is reintroduced, and the various elements of both languages that fall under these divisions are compared point by point. *Permission of instructor.*

ASL 1522 Discourse Analysis for Interpreters **4 QH**
Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq. ASL 1250 and ASL 1302 or permission of instructor.*

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805 Directed Study **4 QH each**
Offers students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

ASL 1810 Special Topics in Interpreting **4 QH**
Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Populations settings will rotate and may include elderly, children, and foreign Deaf adults, as well as deaf-blind, multihandicapped, visual-gestural, educational, high-tech, and performing arts settings. *Prereq. ASL 1506. Majors only or permission of instructor. May be taken twice for credit.*

ASL 1820 Interpreting Practicum **4 QH**
Features practical interpreting experience in agencies serving Deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. *Prereq. ASL 1507 and ASL 1520, both with a grade of B or better. Majors only or permission of instructor. May be taken twice for credit.*

Anthropology

SOA 1100 Peoples and Cultures **4 QH**
Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1101 Cultural Meaning and Everyday Life **4 QH**
Studies the underlying patterns of meaning that are below the surface of everyday thought and behavior. Examines daily routines, leisure activities, joking and humor, speech patterns, popular culture, current folklore and mythology, nonmonetary economic transactions, kinship and friendship, and religion and ritual.

SOA 1104/IAF 1104 Cultures of the World **4 QH**
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (Core Category II)

SOA 1120 Camera on Culture: Visual Anthropology **4 QH**
Explores how cultures are portrayed on film. Examines anthropologists' use of film to gather information and represent other peoples. Also examines how filmmakers from postcolonial societies have addressed the respective cultures, the experience of colonialism, and the nature of film-making and film/video consumption in the third world. When possible, a production experience is included. (Core Category IV)

SOA 1125 Stones and Bones: Prehistory in the New World **4 QH**
Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the forming communities of the Southwestern United States and Mississippi River area.

SOA 1133 The Americas from an Indigenous Perspective **4 QH**
Examines the history and culture of the Americas (North America, Mexico, Central America, South America, and the Caribbean) from the perspectives of its original inhabitants. Provide students with the understanding that history involves looking at not only the histories that we were never told, but also the ways in which the histories of the indigenous Americans were distorted and stereotyped. Examines the ways in which indigenous Americans are reclaiming their histories and culture in a variety of arenas and how the ways indigenous peoples have been encoded into history both influences how they are described in popular culture and textbooks and sets the tone for current issues such as territorial autonomy, political representation, control of native resources, and human rights that are fundamental in their communities. Developed through a collaborative process with indigenous students at Northeastern and elsewhere.

SOA 1146 Rural Workers in the Third World **4 QH**
Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (Core Category IV)

SOA 1155 Individual and Culture **4 QH**
Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family **4 QH**
Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the

patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression **4 QH**
Evaluates, by using anthropological investigations, the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness **4 QH**
Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1275 Musical Culture: Notes in the Modern World **4 QH**
Explores issues of class, ethnicity, gender, sexuality, and age in the cross-cultural context of music as expressed in performances, recordings, videos, literary, and ethnographic materials. The course will also examine the social production and consumption of music. Expects students to conduct a series of field exercises.

SOA 1301 Human Origins **4 QH**
Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (Core Category II)

SOA 1303 Sexuality and Culture **4 QH**
Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures **4 QH**
Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary third world and postcolonial societies; examines local responses to those changes.

SOA 1320 Anthropology Methods **4 QH**
Examines theory and practice of methods of field research and data analysis. Gives students the opportunity to take part in a field project.

SOA 1335 Language and Culture **4 QH**
Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and Creoles. Includes several field assignments.

SOA 1345 People in Cities **4 QH**
Studies urban life and urban problems, using international case studies. Addresses rural/urban and international migration, the relationship of urban settlement to employment patterns, the creation of inner-city or suburban ghettoes or squatter settlements, and movements for city services in areas of spontaneous growth. Gives students the chance to design and implement a field project.

SOA 1425 Cultural Survival **4 QH**
Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development **4 QH**
Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (Core Category IV)

SOA 1431 Native North Americans **4 QH**
Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth **4 QH**
Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) **4 QH**
Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study **4 QH each**
Offers independent work on a chosen topic under the direction of members of the department. *Prereq. Senior standing and department approval.*

SOA 1820, SOA 1821, SOA 1822, SOA1823 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

SOA 3100 Theory **4 QH**
Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 **4 QH**
Introduces the history of painting, sculpture, architecture, and related arts through a study of masterpieces of Western art from prehistoric times to the end of the Middle Ages. Provides an opportunity for students to become familiar with specific works, styles, and terminology of art before 1400, and to develop an ability to communicate about the visual arts. *Art majors or permission of instructor.*

ART 1101 History of Art from 1400 to the Present **4 QH**
Introduces the history of painting, sculpture, architecture, and related arts through a study of masterpieces of Western art from the end of the Middle Ages to the present. Offers students the opportunity to become familiar with specific works, styles, and terminology of art. Emphasizes communication about the visual arts. *Art majors or permission of instructor.*

ART 1106 Introduction to Art **4 QH**
Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (Core Category II)

ART 1111 Introduction to World Architecture **4 QH**
Introduces selected examples of world architecture and urbanism. Emphasizes historic development of architecture, building types, stylistic characteristics, and relations between architectural works and the cultures that produce them. (Prehistoric to c. 1300.)

ART 1124 Basic Drawing **4 QH**
Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.

ART 1127 Basic Painting **4 QH**
Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.

ART 1130 Visual Studies Foundation 1 **4 QH**
Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2 **4 QH**
Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms. *Prereq. ART 1124 and ART 1130.*

ART 1132 Principles of Graphics **4 QH**
Explores conceptual principles underlying the professional practice of design, including visual problem-solving processes, terminology, and methodology. Offers students the opportunity to learn to determine problem objectives, work to specifications, and investigate creative alternatives through lectures and critiques tied to assigned problems for which students are expected to present professionally crafted solutions. *Prereq. ART 1130 or permission of instructor.*

ART 1133 Graphic Design 1 **4 QH**
Applies graphic design principles to the correlation of forms with their function, content, and context. Explores a variety of media, including letterform photographic image-making and manipulation, and 3-D forms as elements of visual solutions. Exposes students to many forms of visual expression, including artists' books and moving images. *Prereq. ART 1132, ART 1134, and ART 1160.*

ART 1134 Typography 1 **4 QH**
Introduces letterforms in visual communication. Studies typography as form and explores visual principles affecting organization and access of typographic information. Introduces use of the typographic grid and issues of hierarchy and legibility through assigned projects, readings, and lectures. Includes exploration of the history, character, and potential application of a variety of typefaces. *Prereq. ART 1130 or permission of instructor.*

ART 1144 Typography 2 **4 QH**
Builds on the studies in ART 1134, shifting the focus from letterform to text type in a series of projects and exercises. Assignments increase in typographic complexity, bringing into play issues of structure, hierarchy, legibility, and readability in a variety of applications and media. *Prereq. ART 1134.*

ART 1150 Architectural Design 1 **4 QH**
Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of seminal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq. ART 1156 or GE 1103.*

ART 1151 Architectural Design 2 **4 QH**
Introduces the idea of architectural language. Projects include analysis of a specific building by an important modern architect, the design of a single space within an existing structure, and a new building designed to coordinate with the original modern building. The studio focuses on composition, structure, materials, drawing, and craft. *Prereq. ART 1150.*

ART 1156 Architectural Drafting **4 QH**
Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axonometric, one- and two-point perspective drawings. *Prereq. ART 1124.*

ART 1160 Introduction to Photography **4 QH**
Explores the basics of black and white photography. Introduces the 35mm camera, manual exposure control, negative processing, and black and white printing in the department's state-of-the-art lab. *No previous photography experience required.* Lab fee.

ART 1170 Filmmaking Workshop **4 QH**
Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.

ART 1180 Video Basics **4 QH**
Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.

ART 1190 Introduction to Computer Graphics **4 QH**
Extends the study of visual problem-solving by introducing the computer as a tool for design and image-making. Weekly classes and labs in the Electronic Studios allow investigation into the medium's potential, limitations, and relationship to other media. Issues of sequencing, transformation, and motion through time and space are emphasized, with examination of their relevance to a broad spectrum of applications and disciplines. *Prereq. ART 1130 and ART 1131 or permission of instructor.*

ART 1203 Medieval Architecture **4 QH**
Studies the major religious and secular buildings of the Early Christian, Byzantine, and Gothic periods, emphasizing Gothic architecture of France and England.

ART 1204 Renaissance Architecture **4 QH**
Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.

ART 1205 Renaissance Art **4 QH**
Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time. (Core Category III)

ART 1210 Nineteenth Century Painting **4 QH**
Explores art from 1780 to 1900. Considers developments such as neo-classicism, romanticism, realism, impressionism, and symbolism in terms of major changes in society: the city of Paris, industrialization, Transcendentalism, photography, Japonisme, the portrayal of women, and the Salons. Emphasizes French painting, but important developments in other European countries and America are considered. Museum visits included. (Core Category III)

ART 1213 Modern Art **4 QH**
Examines the ideas and artists from the 1880s through the 1980s. Focuses on major developments in twentieth century European and American painting, but also surveys sculpture, design, and related arts. Presents a thematic approach, exploring abstraction, expressionism, surrealism, utopian ideas of pure form, modernism, and post-modernism. Museum visits included.

ART 1216/AFR 1200 Survey of African Art **4 QH**
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critique, discussions, fieldwork, and hands-on interaction with art objects.

ART 1218/AFR 1151 African-American Art History **4 QH**
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

ART 1220 American Art **4 QH**
Offers a broad survey of the history of American painting and sculpture from the seventeenth century to the present. Explores the social and cultural forces as well as the aesthetic and intellectual concerns that shape the evolution of art in America. Includes frequent visits to the Museum of Fine Arts and the Gardner Museum. (Core Category III)

ART 1223 American Architecture **4 QH**
Offers an introduction to the history, theory, and criticism of American architecture and urban planning from the mid-1600s to the 1930s. Explores the social and cultural forces that shape the built environment. Examines European influences as well as uniquely American contributions. Emphasizes the work of Louis Sullivan, H. H. Richardson, and Frank Lloyd Wright. (Core Category III)

ART 1225 Modern Architecture: The Nineteenth Century **4 QH**
Surveys the development of modern architecture in the United States and Europe from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design in the context of their cultural responses to society's changing conditions. Includes field trips. *A previous course in art or architectural history is recommended.*

ART 1226 Modern Architecture: The Twentieth Century **4 QH**
Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism and deconstruction. Includes field trips. *A previous course in art or architectural history is recommended.*

ART 1230 History of Photography **4 QH**
Explores photography from its origins in 1839 to its maturity after World War II. Examines technological advances, the documentary aesthetic, art photography, and theoretical approaches to the study of the medium. Photographs are studied as art objects, personal statements, and historical artifacts. Museum visits included.

ART 1233 Contemporary Directions in Photography **4 QH**
Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.

ART 1235 History of Film **4 QH**
Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

ART 1236 American Film **4 QH**
Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.

ART 1237 Contemporary Directions in Cinema **4 QH**
Provides a comparative study of major international film movements from World War II to the present. Studies selected films by representative contemporary directors. Includes lectures, screenings, and discussions.

ART 1240 History of Graphic Design **4 QH**
Considers the history, context, and issues of graphic design through lectures, readings, discussions, and projects. *Prereq. ART 1101.*

ART 1243 Graphic Design 2 **4 QH**
Investigates the range of conceptual possibilities inherent in the merging of words/text with images/symbols through the understanding of how their relationship can enhance meaning and comprehension. Explores visual poetry, choices in mark and form, and applied semiotics through projects, readings, and lecture/discussion. *Prereq. ART 1133 and ART 1250.*

ART 1244 Graphic Design 3 **4 QH**
Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. *Prereq. ART 1190 and ART 1243.*

ART 1250 Color Theory and Practice **4 QH**
Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.

ART 1252 Architectural Design 3 **4 QH**
Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq. ART 1151.*

ART 1253 Architectural Design 4 **4 QH**
Introduces the study of urban design. Students learn to analyze the structures and ordering systems of both historical and contemporary cities. Projects include urban analysis (frequently focusing on the Boston area) and proposed solutions. This studio addresses the problems associated with designing at several different scales at one time.

ART 1254 Intermediate Drawing **4 QH**
Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq. ART 1124 or equiv.*

ART 1256 Theory of Structures 1 **4 QH**
Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq. PHY 1222.*

ART 1257 Theory of Structures 2 **4 QH**
Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber, frame, space frame, and shell systems. *Prereq. ART 1256 and PHY 1222.*

ART 1261 Intermediate Black and White Photography **4 QH**
Emphasizes combining personal aesthetic choices with work to refine photographic skills. A second-level black and white photography studio/lab course. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq. ART 1160 or permission of instructor.*

ART 1263 Introduction to Color Photography **4 QH**
Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in photography and contemporary color photographic processes. Working with color negative films, students get hands-on experience with the RA-4 color print process. Assignments emphasize solving technical and aesthetic problems inherent in color negative materials and include weekly lab sessions. Color chemistry and facilities are provided. Lab fee. *Prereq. ART 1160.*

ART 1264 Color Photography 2 **4 QH**
Allows students to explore and develop their personal photographic style with an emphasis on experimentation. A second-level color course. Studies historical perspective of color photography contrasted with contemporary color work. Offers students the opportunity to develop the necessary foundation for critical analysis of their own work through required reading. Includes weekly assignments and critiques. Students will develop a cohesive portfolio of photographs. Lab fee. *Prereq. ART 1261 and ART 1263.*

ART 1280 Media Graphics **4 QH**
An intermediate computer-based course in creating moving images. Time-based sequencing and characteristics of motion and transformation are explored in a series of digital projects and lab workshops. Projects increase in length and complexity, and may have a basis in instructional or information design, entertainment, or artistic exploration. Analogies between digital moving image and other time-based arts are explored through assignments, lectures, demonstrations, and visits to professional studies. Introduces interactivity and multiple media. *Prereq. ART 1133 and ART 1190.*

ART 1281 Video Project **4 QH**
Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq. ART 1180 or equivalent.*

ART 1285 Interarts **4 QH**
Introduces nontraditional art concepts in an intensive studio course. Includes categories of performance art, installation art, electronic art, multimedia and kinetic art. Using their own frames of reference and experience, students contribute to a collaborative project and are responsible for keeping a journal

that will help them formulate their ideas. Students reflect upon their co-ops, internships, and other art-related experiences in a written essay that will accompany their final product. All general art majors are required to take this course after their Foundations courses and their 12 required art courses.

ART 1290 Electronic Publishing Design **4 QH**
Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. *Prereq. ART 1132, ART 1134, and ART 1190.*

ART 1291 Computer Graphics Workshop **4 QH**
Builds on the visual and technical experience of ART 1190 in a sequence of applied projects integrating word and image. Emphasizes imaginative and effective use of digital input and output devices, in conjunction with conventional media, to develop unexpected visual language. Portions of weekly classes are conducted as collaborative workshops and supported by labs, with students encouraged to interact with each other to enhance technical, problem-solving, and effective critiquing skills. *Prereq. ART 1144, ART 1190, and ART 1243.*

ART 1295 Computer-Aided Design **4 QH**
Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications. *Prereq. ART 1190 or equivalent.*

ART 1296 Advanced Studio in Computer Visualization **4 QH**
Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis. *Prereq. ART 1295.*

ART 1310 Seminar in Modern Architecture **4 QH**
Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism, post-modernism, and deconstruction. Focuses on the work and ideas of such architects as Le Corbusier, Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Peter Eisenman, Frank Gehry, and Rem Koolhaas. *Prereq. ART 1226 or permission of instructor.*

ART 1324 Thesis in Art History **4 QH**
Focuses on the production of a 20–30 page thesis. Students undertake individual research, under the direction of a faculty member, on art-historical topics appropriate to their personal and professional interests. Conceived for art majors who are completing the BA degree and whose primary interest is in art history. *Arts and Sciences experiential education requirement. Prereq. ART 1100, ART 1101, 20 QH in other art history courses, departmental permission.*

ART 1330 Advanced Visual Communication **4 QH**
Presents an advanced seminar whose development sequence mirrors that of complex professional design projects. Extends a single applied project in phases through an entire term. Central to the course will be a substantive written problem definition and program development integrating academic and applied design experience. *Arts and Sciences experiential education requirement. Prereq. ART 1144, ART 1244, and ART 1280.*

ART 1341 Architectural Design 5 **6 QH**
Introduces the issues of "tectonics," or the logic and order of assembling a building's parts. Looks at the different characteristics of materials and how they can be combined to achieve different effects. Students work on a single project throughout the term, focusing first on the specific connections of building parts and moving later to the general order of the project. *Prereq. ART 1253.*

ART 1342 Architectural Design 6 **6 QH**
Requires students to integrate previously acquired knowledge in the resolution of a specific building program for a specific site. Provides students with the opportunity to investigate the relationship between the different aspects of design and how it leads to the resolution of architectural forms. Incorporates the issues of context, tectonics, and typology into the design of a single building. *Prereq. ART 1341.*

ART 1352 Architectural Thesis **6 QH**
The final studio course. Provides an opportunity for students to investigate different sites around the New Urban Ring in Boston, and to synthesize knowledge from previous design studios, history and technical courses, as well as various co-op work experiences. Students are expected to develop design strategies through drawings, models, and writings toward the creation of a well-developed architectural project. *Arts and Sciences experiential education requirement. Prereq. ART 1150-1151, ART 1252-1253, ART 1341, and ART 1342.*

ART 1355 Environmental Systems **4 QH**
Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq. ART 1252 or permission of instructor.*

ART 1363 Advanced Photography Seminar **4 QH**
Requires that students refine their technical skills, master the 4 × 5 inch view camera (supplied), and make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. The capstone course to the Photography Program, this course stresses individual direction and a qualitative approach to substantive photography. Lab fee. *Arts and Sciences experiential education requirement. Prereq. Permission of instructor.*

ART 1713 Modern Art (Honors) **4 QH**
Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq. Honors status or permission of instructor.*

ART 1800, ART 1801, ART 1802 Directed Study **4 QH each**
Offers independent work under the direction of members of the department on a chosen topic. *Prereq. Junior or senior art major and department approval.*

ART 1803, ART 1804, ART 1805 Directed Study **6 QH each**
Offers independent work under the direction of members of the department on a chosen topic. *Prereq. Junior or senior art major and department approval.*

ART 1810, ART 1811, ART 1812, ART 1813 **4 QH each**
Junior/Senior Honors Program
For details contact the honors office.

ART 1814 Directed Study **1 QH**
Offers independent work under the direction of members of the department on a chosen topic.

Biology

Courses are presented in three categories: non-science majors; health-related science and other non-biology science majors; and biology majors. Two or more courses with substantially the same content may not be counted toward quantitative graduation requirements. If a student is not sure whether particular courses overlap it is his/her responsibility to get advice from a departmental advisor.

The following courses are primarily for non-science majors. These courses are not open to biology majors.

BIO 1111 Environment and Man **4 QH**
Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. (Core Category II)

BIO 1171 Focus on the Sea: Issues and Nature **2 QH**
Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1174 Introduction to Marine Biology **3 QH**
Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. (Formerly BIO 1175) Taken concurrently with BIO 1675 lab.

BIO 1182 The Human Organism **4 QH**
Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. (Formerly BIO 1181) Taken concurrently with BIO 1683 lab.

BIO 1187 Biology of Human Reproduction **4 QH**
Studies the sexual and reproductive function in the human male and female, including sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually-transmitted disease. Analyzes factors affecting reproduction and sexuality in various human populations.

BIO 1675 Introduction to Marine Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1174. Lab fee.

BIO 1683 Human Organism Lab **1 QH**
Laboratory taken concurrently with BIO 1182. Lab fee.

The following courses are primarily for majors in science- or health-related professions. These courses, where indicated, are not open to biology majors.

BIO 1108 General Biology **4 QH**
Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. (Formerly BIO 1106) Taken concurrently with BIO 1608 lab. (Overlaps BIO 1100 and BIO 1142).

BIO 1109 Animal Biology **4 QH**
Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. (Formerly BIO 1107) Taken concurrently with BIO 1609 lab. (Overlaps BIO 1101 and BIO 1143.) *Prereq. BIO 1108 and BIO 1608.*

BIO 1122 Basic Microbiology **4 QH**
Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. (Formerly BIO 1120) Taken concurrently with BIO 1622 lab. (Overlaps BIO 1323.) *Prereq. BIO 1142 and BIO 1642, or permission of instructor; not open to biology majors.*

BIO 1142 Basic Animal Biology 1 **4 QH**
Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. (Formerly BIO 1140) Taken concurrently with BIO 1642 lab. (Overlaps BIO 1100 and BIO 1108.)

BIO 1143 Basic Animal Biology 2 **4 QH**
Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. (Formerly BIO 1141) Taken concurrently with BIO 1643 lab. (Overlaps BIO 1101 and BIO 1109.) *Prereq. BIO 1142 and BIO 1642.*

BIO 1160 Functional Human Anatomy and Physiology 1 **4 QH**
Covers cell and tissue structure and function, anatomical terminology, and the anatomy and physiology of bones, muscles, and the nervous system. (Formerly BIO 1150) Taken concurrently with BIO 1650 lab. (Overlaps BIO 1162.) *Not open to biology majors.*

BIO 1161 Functional Human Anatomy and Physiology 2 **4 QH**
Covers anatomy and physiology of the respiratory, digestive, urogenital, endocrine, and cardiovascular systems, and a brief exploration of the anatomy and physiology of the eye and ear. (Formerly BIO 1151) Taken concurrently with BIO 1651 lab. (Overlaps BIO 1163 and BIO 1164.) *Prereq. BIO 1160 and BIO 1650; not open to biology majors.*

BIO 1162 Integrated Human Anatomy and Physiology 1 **4 QH**
Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of skin, bones, muscles, and blood. (Formerly BIO 1152) Taken concurrently with BIO 1652 lab. (Overlaps BIO 1160.) *Not open to biology majors.*

BIO 1163 Integrated Human Anatomy and Physiology 2 **4 QH**
Presents the structure and function of the following systems: nervous, endocrine, and reproductive. (Formerly BIO 1153) Taken concurrently with BIO 1653 lab. (Overlaps BIO 1161.) *Prereq. BIO 1162 and BIO 1652; not open to biology majors.*

BIO 1164 Integrated Human Anatomy and Physiology 3 **4 QH**
Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. (Formerly BIO 1154) Taken concurrently with BIO 1654 lab. (Overlaps BIO 1161.) *Prereq. BIO 1163 and BIO 1653; not open to biology majors.*

BIO 1608 General Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1108. Lab fee.

BIO 1609 Animal Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1109. Lab fee.

BIO 1622 Basic Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1122. Lab fee.

BIO 1642 Basic Animal Biology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1142. Lab fee.

BIO 1643 Basic Animal Biology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1143. Lab fee.

BIO 1650 Functional Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1160. Lab fee.

BIO 1651 Functional Human Anatomy and Physiology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1161. Lab includes studies of sensory physiology, enzymes, metabolism, and cardiovascular, respiratory, and urinary function. Lab fee.

BIO 1652 Integrated Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1162. Lab includes pig dissection. Lab fee.

BIO 1653 Integrated Human Anatomy and Physiology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1163. Lab includes pig dissection. Lab fee.

BIO 1654 Integrated Human Anatomy and Physiology 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1164. Lab includes pig dissection. Lab fee.

BIO 1660 Functional Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1160. Lab includes the study of human bones and muscles, pig dissection, and muscle and nerve physiology. Lab fee.

The following courses are primarily for biology majors but are open to other students with appropriate prerequisites and permission of the instructor.

BIO 1100 Principles of Biology 1 **4 QH**
Introduces basic biological principles. Topics include: the first human retrovirus; the nature of scientific thought and knowledge; launching the antibiotic era; diabetes and the discovery of insulin; the cellular pathway of insulin secretion; DNA science; the principles of inheritance, and others. Integrates topics into discussions of disease and pathological processes and how fundamental biological principles form the foundation of medical science. (Formerly BIO 1103) Taken concurrently with BIO 1600 lab.

BIO 1101 Principles of Biology 2 **4 QH**
Introduces the diversity of animals through presentation of their systematic relationships, structure and function, and ecological roles. Cellular, tissue, and organismal levels are included. (Formerly BIO 1104) Taken concurrently with BIO 1601 lab. *Prereq. BIO 1100 and BIO 1600.*

BIO 1102 Principles of Biology 3 **4 QH**
Examines the biology and diversity of plants and plant-like organisms. Explores the relationships between humans and plants by looking at plants through three different perspectives: 1) Feeding a Starving World; 2) Curing a Sick World; and 3) Engineering a Better World. Employs case studies to highlight major themes. (Formerly BIO 1105) Taken concurrently with BIO 1602 lab. *Prereq. BIO 1100 and BIO 1600 or BIO 1108 and BIO 1608.*

BIO 1222 Environmental and Population Biology **4 QH**
Considers physical and chemical factors of the environment as they affect the distribution of organisms and as they may in turn be affected by the organisms. Includes population dynamics, species interactions, population genetics (lightly), the development of communities, and the structure and function of ecosystems. (Formerly BIO 1212) Taken concurrently with BIO 1611 lab. *Prereq. BIO 1102, BIO 1602, and BIO 1108, BIO 1608, and BIO 1109, BIO 1609 or BIO 1100-1102, BIO 1600-1602, and CHM 1111.*

BIO 1270 Diving Research Methods **4 QH**
Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, under water measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq. Scuba certification.*

BIO 1282 Genetics **4 QH**
Focuses on classical and molecular approaches to understanding heredity. Topics include Mendelian genetics, linkage, recombination, gene mapping, chromosomal genetics, molecular genetics, recombinant DNA methods, gene regulation, and developmental genetics. (Formerly BIO 1280) Taken concurrently with BIO 1660 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602 and BIO 1108–1109, BIO 1608–1609, and CHM 1264.*

BIO 1283 Introductory Biochemistry **4 QH**
Topics include structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways. (Formerly BIO 1281) Taken concurrently with BIO 1661 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602, and BIO 1108–1109, BIO 1608–1609, BIO 1282 and BIO 1660, CHM 1221, and CHM 1265.*

BIO 1317 Marine Ecology **4 QH**
Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. East/West program, Friday Harbor. (Formerly BIO 1312) Taken concurrently with BIO 1613 lab. *Prereq. Two years of college biology.*

BIO 1321 Evolution **4 QH**
Discusses history of evolutionary theory and lines of evidence. Emphasis is placed on mechanisms of speciation. Introduces current evolutionary topics. (Formerly BIO 1311) Taken concurrently with BIO 1621 lab. *Prereq. BIO 1102, BIO 1602 or BIO 1109, BIO 1609, and BIO 1222, BIO 1611, and BIO 1282, BIO 1660.*

BIO 1323 General Microbiology **4 QH**
Introduces morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1122.) (Formerly BIO 1320) Taken concurrently with BIO 1623 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602, and BIO 1108–1109, BIO 1608–1609; CHM 1111, and CHM 1122.*

BIO 1333 Marine Botany **4 QH**
Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. (Formerly BIO 1330) Taken concurrently with BIO 1630 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602, and BIO 1108–1109, BIO 1608–1609.*

BIO 1334 Molecular Marine Botany **4 QH**
Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. (Formerly BIO 1332) Taken concurrently with BIO 1644 lab. *Prereq. BIO 1333 and BIO 1630.*

BIO 1343 Vertebrate Zoology **4 QH**
Presents systematics, behavior, ecology, and zoogeography of all classes of vertebrates. (Formerly BIO 1341) Taken concurrently with BIO 1641 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, and BIO 1609.*

BIO 1344 Biology of Crustacea **4 QH**
Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. (Formerly BIO 1342) Taken concurrently with BIO 1645 lab. *Prereq. BIO 1373 or GEO 1428 or permission of instructor.*

BIO 1346 Embryology **4 QH**
Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Lab work emphasizes the frog, chick, and pig. (Formerly BIO 1347) Taken concurrently with BIO 1646 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609 and BIO 1282, BIO 1660.*

BIO 1349 Animal Histology **4 QH**
Offers microscopic study of fundamental types of animal tissues. (Formerly BIO 1348) Taken concurrently with BIO 1648 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609.*

BIO 1355 Regulatory Cell Physiology **4 QH**
Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical messengers and regulators, and principles of cellular contraction and motility. (Formerly BIO 1350) Taken concurrently with BIO 1655 lab. *Prereq. BIO 1101 and BIO 1601 or BIO 1109 and BIO 1609.*

BIO 1356 Comparative Vertebrate Anatomy **4 QH**
Examines the morphology and phylogeny of the vertebrates. (Formerly BIO 1351) Taken concurrently with BIO 1656 lab. *Prereq. BIO 1101 and BIO 1601 or BIO 1109 and BIO 1609.*

BIO 1373 Marine Invertebrate Zoology **4 QH**
Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. (Formerly BIO 1370) Taken concurrently with BIO 1673 lab. *Prereq. BIO 1101 and BIO 1601 or BIO 1109 and BIO 1609.*

BIO 1387 The Biology of Corals **4 QH**
Concentrates on tropical crudaria; studies the systematics, anatomy, physiology, and ecology of this group of animals that assume such an important role in tropical marine ecosystems. East/West Program, Jamaica. Taken concurrently with BIO 1687 lab. *Prereq. Two years of college biology.*

BIO 1403 Histologic Technique **4 QH**
Discusses general methods of tissue preparation for purposes of microscopic study. Taken concurrently with BIO 1603 lab. *Prereq. BIO 1102 and BIO 1602.*

BIO 1413 Tropical Terrestrial Ecosystems **3 QH**
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq. Two years of college biology.*

BIO 1414 Benthic Marine Ecology **4 QH**
Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. (Formerly BIO 1412) Taken concurrently with BIO 1612 lab. *Prereq. BIO 1222 and BIO 1611; BIO 1373 and BIO 1673.*

BIO 1416 Microbial Physiology **4 QH**
Focuses on structure and function of the bacterial cell, emphasizing its general properties as well as on the physical and chemical factors that influence it. (Formerly BIO 1420) Taken concurrently with BIO 1616 lab. *Prereq. BIO 1323 and BIO 1623 or equivalent.*

BIO 1418 Marine Microbial Ecology **4 QH**
Examines the diversity of marine microorganisms and recent advances in the area of microbial ecology. Emphasizes the structure and function of microbial food webs in marine communities. Taken concurrently with BIO 1615 lab. *Prereq. Two years of college biology.*

BIO 1419 Plant Physiology **4 QH**
Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral metabolism and nutrition, photosynthesis, hormones, growth, and development are included. (Formerly BIO 1430) Taken concurrently with BIO 1629 lab. *Prereq. BIO 1102, BIO 1602, and CHM 1265.*

BIO 1426 Medical Microbiology **4 QH**
Emphasizes host-parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. (Formerly BIO 1427) Taken concurrently with BIO 1626 lab. *Prereq. BIO 1323 and BIO 1623 or equivalent.*

BIO 1433 Lower Plants **4 QH**
Examines the morphology, ultrastructure, ecology, life cycles, and reproductive strategies of nonvascular plants. Taken concurrently with BIO 1633 lab. *Prereq. BIO 1102 and BIO 1602.*

BIO 1434 Higher Plants **4 QH**
Studies the origin and evolution of land plants since their invasion of the land surface in late Silurian and early Devonian times, approximately 405 to 370 million years ago; compares early and modern land plants and discusses their evolution; examines the flower as a reproductive structure. (Formerly BIO 1432) Taken concurrently with BIO 1634 lab. *Prereq. BIO 1102 and BIO 1602.*

BIO 1435 Plant Development **4 QH**
Examines the structural and molecular aspects of plant development beginning with the fertilization apparatus of higher plants and the development of the embryonic plant. Studies the structure and development of the vegetative and reproductive organs of the plant. Applies the advances in the fields of cellular and molecular biology to the interpretation of plant development. Students progress from learning fundamental information on each topic through reading contemporary research papers. Student projects will be the focus of the laboratory. (Formerly BIO 1437) Taken concurrently with BIO 1635 lab. *Prereq. BIO 1102 and BIO 1602.*

BIO 1442 Vertebrate Paleontology **4 QH**
Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1222, BIO 1611 and BIO 1282, BIO 1660; or permission of instructor.*

BIO 1450 Immunology **4 QH**
Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq. BIO 1283 or BIO 1461. May be taken concurrently with BIO 1467.*

BIO 1452 Comparative Neurobiology **4 QH**
Presents a cellular approach to structure and function of the nervous system. Topics include neuronal anatomy, cellular properties of single neurons, synaptic transmission, integration in nerve cells, nerve networks, sensory systems, motor systems, sensory-motor integration, specification of neuronal connectivity, and phylogeny of nervous systems. *Prereq. General (animal) physiology.*

BIO 1455 Advanced Invertebrate Zoology **4 QH**
Concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. (Formerly BIO 1440) Taken concurrently with BIO 1662 lab.. *Prereq. Two years of college biology.*

BIO 1456 Parasitology **4 QH**
Examines the symbiotic relationships of parasitic protozoans, flatworms, nematodes, and arthropods. (Formerly BIO 1441) Taken concurrently with BIO 1663 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609 and BIO 1282, BIO 1660.*

BIO 1458 Wildlife Biology **4 QH**
Presents concepts and techniques utilized in the conservation and study of wild vertebrates in lecture, laboratory, and weekly field trips. Subjects include habitat management, endangered species, exotic species, zoonoses, financing, and legislation. (Formerly BIO 1444) Taken concurrently with BIO 1658 lab. *Prereq. BIO 1222, BIO 1611 and BIO 1343, BIO 1643.*

BIO 1459 Ornithology **4 QH**
Discusses anatomy, physiology, behavior, ecology, and systematics of birds. (Formerly BIO 1446) Taken concurrently with BIO 1659 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609 and BIO 1222, BIO 1611.*

BIO 1460 Current Concepts in Cell Biology **4 QH**
Examines selected topics in cellular structure and function of eukaryotes, for example, compartmentalization and its underlying physical and biochemical processes. Topics will vary. Lab fee. *Prereq. BIO 1282 and BIO 1660.*

BIO 1461 General Biochemistry **4 QH**
Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, nucleotides, and amino acids. *Prereq. BIO 1282, BIO 1660, and organic chemistry. May be taken concurrently with BIO 1462.*

BIO 1462 General Biochemistry Laboratory **4 QH**
Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two lab periods and one lecture per week. Lab fee. *Prereq. BIO 1283, BIO 1661, or concurrent with BIO 1461.*

BIO 1463 Cellular Biochemistry **4 QH**
Emphasizes the structure and function of organelles, mechanisms of signal transduction, and regulation of gene expression. *Prereq. BIO 1283, and BIO 1661.*

BIO 1464 Marine Birds and Mammals **4 QH**
Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. (Formerly BIO 1449) Taken concurrently with BIO 1669 lab. *Prereq. BIO 1222, BIO 1611 and BIO 1343, BIO 1643.*

BIO 1467 Molecular Biology **4 QH**
Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes experimental design and proof in macromolecular chemistry and genetics. *Prereq. BIO 1283, BIO 1661, or BIO 1461. May be taken concurrently with BIO 1450.*

BIO 1468 Mammalogy **4 QH**
Discusses anatomy, physiology, behavior, ecology, and systematics of mammals. (Formerly BIO 1448) Taken concurrently with BIO 1668 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1222, BIO 1611.*

BIO 1473 Systems Physiology **4 QH**
Covers function and regulation of major physiological systems in animals including energy metabolism, thermoregulation, muscle and movement, circulation, respiration, salt and water balance, and circadian rhythms. Emphasizes vertebrates but material on invertebrates will be included where appropriate. (Formerly BIO 1454) Taken concurrently with BIO 1677 lab. *Prereq. BIO 1283, BIO 1661 or BIO 1355, BIO 1655, or permission of instructor.*

BIO 1474 Neuroethology **4 QH**
Concentrates on the mechanisms underlying behavior of model invertebrates and lower invertebrates in a lecture, field, and lab course. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. (Formerly BIO 1457) Taken concurrently with BIO 1674 lab. *Prereq. BIO 1283 and BIO 1661.*

BIO 1476 Herpetology **4 QH**
Emphasizes the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Mandatory field trips. (Formerly BIO 1447) Taken concurrently with BIO 1676 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1282, BIO 1660.*

BIO 1480 Senior Biochemistry Seminar **1 QH**
Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq. BIO 1283 and BIO 1661.*

BIO 1481 Ocean and Coastal Processes 1 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. The first of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Friday Harbor. (Formerly BIO 1470) Taken concurrently with BIO 1680 lab. *Prereq. Two years of college biology.*

BIO 1482 Ocean and Coastal Processes 2 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. The second of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Jamaica. (Formerly BIO 1471) Taken concurrently with BIO 1681 lab. *Prereq. Two years of college biology.*

BIO 1483 Ocean and Coastal Processes 3 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles through comparative studies. The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Offered at Marine Science Center in Nahant. (Formerly BIO 1472) Taken concurrently with BIO 1682 lab. *Prereq. Two years of college biology.*

BIO 1485 Biology and Ecology of Fish **4 QH**
Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. (Formerly BIO 1475) Taken concurrently with BIO 1685 lab. *Prereq. Two years of college biology.*

BIO 1486 Environmental Microbiology **4 QH**
Studies the microbial environment and ecology of the cell. Explores interactions between microbial populations, stressing soil and fresh water associations. Taken concurrently with BIO 1686 lab. *Prereq. BIO 1323 and BIO 1623.*

BIO 1489 Adaptations of Aquatic Organisms **4 QH**
Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. (Formerly BIO 1479) Taken concurrently with BIO 1689 lab. *Prereq. Two years of college biology.*

BIO 1490 Senior Seminar **1 QH**
Examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Emphasizes student presentation and analysis. Limited to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq. BIO 1283 and BIO 1661.*

BIO 1491, BIO 1492 Directed Study 1, 2 **2 QH each**
Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq. BIO 1283 and BIO 1661.*

BIO 1494 Experiential Education Capstone in Biology **4 QH**
Integrates student experiential activities with academic coursework, in the framework of a scientific poster presentation or equivalent. Requires extensive written summary of and reflection upon experiences and coursework, library research of scientific questions related to the experiences, and preparation of oral and poster presentations of this research. All phases will be accompanied by classroom discussion and critique. *Prereq. 80 QH and at least one experiential activity.*

BIO 1495, BIO 1496, BIO 1497, BIO 1498 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

BIO 1600 Principles of Biology 1 Lab **1 QH**
Laboratory involves demonstrations and hands-on practice of the concepts discussed in lecture. Laboratory taken concurrently with BIO 1100. Lab fee.

BIO 1601 Principles of Biology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1101. Lab fee.

BIO 1602 Principles of Biology 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1102. Lab fee.

BIO 1603 Histological Technique Lab 1 QH
Laboratory taken concurrently with BIO 1403. Lab fee.

BIO 1611 Environmental and Population Biology Lab 1 QH
Laboratory taken concurrently with BIO 1222. Lab fee.

BIO 1612 Benthic Marine Ecology Lab 1 QH
Laboratory taken concurrently with BIO 1414. Lab fee.

BIO 1613 Marine Ecology Lab 1 QH
Laboratory taken concurrently with BIO 1317. Lab fee.

BIO 1615 Marine Microbial Ecology Lab 1 QH
Laboratory taken concurrently with BIO 1418. Lab fee.

BIO 1616 Microbial Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1416. Lab fee.

BIO 1621 Evolution Lab 1 QH
Laboratory taken concurrently with BIO 1321. Laboratory involves students in library research.

BIO 1623 General Microbiology Lab 1 QH
Laboratory taken concurrently with BIO 1323. Lab fee.

BIO 1626 Medical Microbiology Lab 1 QH
Laboratory taken concurrently with BIO 1426. Lab fee.

BIO 1629 Plant Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1419. Lab fee.

BIO 1630 Marine Botany Lab 1 QH
Laboratory taken concurrently with BIO 1333. Lab fee.

BIO 1633 Lower Plants Lab 1 QH
Laboratory taken concurrently with BIO 1433. Lab fee.

BIO 1634 Higher Plants Lab 1 QH
Laboratory taken concurrently with BIO 1434. Lab fee.

BIO 1635 Plant Development Lab 1 QH
Laboratory taken concurrently with BIO 1435. Student projects will be the focus of the laboratory. Lab fee.

BIO 1641 Vertebrate Zoology Lab 1 QH
Laboratory taken concurrently with BIO 1343. Laboratories consist of study of vertebrate specimens and field trips to observe species in their habitats. Lab fee.

BIO 1644 Molecular Marine Botany Lab 1 QH
Laboratory taken concurrently with BIO 1334. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee.

BIO 1645 Biology of Crustacea Lab 1 QH
Laboratory taken concurrently with BIO 1344. Lab fee.

BIO 1646 Embryology Lab 1 QH
Laboratory taken concurrently with BIO 1346. Lab work emphasizes the frog, chick, and pig. Lab fee.

BIO 1648 Animal Histology Lab 1 QH
Laboratory taken concurrently with BIO 1349. Lab fee.

BIO 1655 Regulatory Cell Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1355. Lab fee.

BIO 1656 Comparative Vertebrate Anatomy Lab 1 QH
Laboratory taken concurrently with BIO 1356. Lab work consists of the dissection of the shark, mud puppy, and cat. Lab fee.

BIO 1658 Wildlife Biology Lab 1 QH
Laboratory taken concurrently with BIO 1458. Lab fee.

BIO 1659 Ornithology Lab 1 QH
Laboratory taken concurrently with BIO 1459. Lab fee.

BIO 1660 Genetics Lab 1 QH
Laboratory taken concurrently with BIO 1282. Laboratory includes work with Drosophila, fungi, bacteria, and DNA plasmids. Lab fee.

BIO 1661 Introductory Biochemistry Lab 1 QH
Laboratory taken concurrently with BIO 1283. Lab fee.

BIO 1662 Advanced Invertebrate Zoology Lab 1 QH
Laboratory taken concurrently with BIO 1455. Lab fee.

BIO 1663 Parasitology Lab 1 QH
Laboratory taken concurrently with BIO 1456. Lab fee.

BIO 1668 Mammalogy Lab 1 QH
Laboratory taken concurrently with BIO 1468. Laboratories involve study of specimens, field collection, and museum preparation, including a weekend field trip. Lab fee.

BIO 1669 Marine Birds and Mammals Lab 1 QH
Laboratory taken concurrently with BIO 1464. Labs include identifying, dissecting, and preparing specimens that occur along the New England coast. Lab fee.

BIO 1673 Marine Invertebrate Zoology Lab 1 QH
Laboratory taken concurrently with BIO 1373. Lab emphasizes living marine forms, with dissection of representative organisms. Lab fee.

BIO 1674 Neuroethology Lab 1 QH
Laboratory taken concurrently with BIO 1474. Lab fee.

BIO 1677 Systems Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1473. Lab fee.

BIO 1680 Ocean and Coastal Processes 1 Lab 1 QH
Laboratory taken concurrently with BIO 1481. Lab fee.

BIO 1681 Ocean and Coastal Processes 2 Lab 1 QH
Laboratory taken concurrently with BIO 1482. Lab fee.

BIO 1682 Ocean and Coastal Processes 3 Lab 1 QH
Laboratory taken concurrently with BIO 1483. Lab fee.

BIO 1685 Biology and Ecology of Fish Lab 1 QH
Laboratory taken concurrently with BIO 1485. Lab fee.

BIO 1686 Environmental Microbiology Lab 1 QH
Laboratory taken concurrently with BIO 1486. Lab fee.

BIO 1687 Biology of Corals Lab 1 QH
Laboratory taken concurrently with BIO 1387. Lab fee.

BIO 1689 Adaptations of Aquatic Organisms Lab **1 QH**
Laboratory taken concurrently with BIO 1489. Lab fee.

Chemistry

Introductory Chemistry Courses

CHM 1100 Chemistry for Managers in a High-Tech World **4 QH**
Examines fundamentals and applications of chemistry of particular interest to students in business. Discusses atomic theory, chemical bonding and reactions, states of matter and common chemicals, and foundations of organic chemistry. Makes applications to plastics and polymers, biochemistry, semiconductors, and nuclear power.

CHM 1104 Environmental Chemistry **4 QH**
Presents the principles of chemistry: molecular structure and reactivity, stoichiometry, equilibrium, and kinetics in the context of environmental issues including global warming, acid rain, aquatic chemistry, and ozone depletion.

CHM 1105 General Chemistry for the Health Sciences 1 **5 QH**
Examines topics in inorganic chemistry relevant to students in the health sciences. Topics include atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases; equilibrium, and kinetics. Topics are related to molecular processes in the human body. Lab fee.

CHM 1106 General Chemistry for the Health Sciences 2 **5 QH**
Introduces organic chemistry and organic substances of biological significance. Covers structure and reactivity of alkanes, alkenes, alkynes, aromatic compounds, oxygen containing compounds (alcohols, aldehydes, ketones, esters, ethers, and carboxylic acids), sulfur containing compounds (thiols and sulfides), nitrogen containing compounds (amines and amides), carbohydrates, proteins, lipids, and nucleic acids. Biological chemistry includes the study of enzymes, vitamins, metabolic pathways, and body fluids. Lab fee. *Prereq. CHM 1105.*

CHM 1107 Basic Chemistry for the Nursing Professional **5 QH**
A survey course beginning with descriptions of atoms and molecules and ending with an understanding of the relationships between the structures and functions of drugs, metabolites, proteins, polysaccharides, nucleic acids, and other important biomolecules. Emphasizes throughout the visualization of chemical compounds and molecules as a means of describing their properties. Lab fee.

CHM 1111 General Chemistry for the Life Sciences 1 **5 QH**
Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (Core Category II)

CHM 1122 General Chemistry for the Life Sciences 2B **5 QH**
For nonchemistry majors who will be taking CHM 1264. Covers chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq. CHM 1111.*

CHM 1130 Fundamentals of Chemistry **4 QH**
Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students 1 **4 QH**
Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2 **4 QH**
Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical and nuclear transformations. *Prereq. CHM 1131.*

CHM 1138 General Chemistry Laboratory **1 QH**
Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1 **5 QH**
For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2 **5 QH**
Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq. CHM 1111 or CHM 1151.*

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry **4 QH**
For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq. CHM 1122 or equivalent.*

CHM 1231 Analytical Chemistry for Majors **5 QH**
For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq. CHM 1152 or equivalent.*

CHM 1264 Organic Chemistry for Biology Science Majors 1 **5 QH**
For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq. CHM 1122, CHM 1152, or equivalent.*

CHM 1265 Organic Chemistry for Biology Science Majors 2 **5 QH**
Continues CHM 1264. Lab fee. *Prereq. CHM 1264.*

CHM 1268 Organic Chemistry for Pharmacy Majors 1 **5 QH**
For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq. CHM 1122, CHM 1152, or equivalent.*

CHM 1269 Organic Chemistry for Pharmacy Majors 2 **5 QH**
Continues CHM 1268. Lab fee. *Prereq. CHM 1268.*

CHM 1271 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1 **3 QH**
For chemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq. CHM 1153 or CHM 1132, and CHM 1138 or equivalent.*

CHM 1272 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 2 **5 QH**
Continues CHM 1271. Lab fee. *Prereq. CHM 1271.*

CHM 1274 Organic Chemistry 3: The Organic Chemistry of Living Process **5 QH**
Examines advanced functional group chemistry, especially as relevant to molecules of nature. Studies polycarbonyl compounds, phenols, carbohydrates, lipids, terpenoids and steroids, amino acids and peptides, alkaloids, nucleic acids, and antibiotics and hormones. Lab fee. *Prereq. CHM 1272 or equivalent.*

CHM 1381 Physical Chemistry 1 **3 QH**
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq. CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equivalent; PHY 1223, PHY 1233, or equivalent.*

CHM 1382 Physical Chemistry 2 **3 QH**
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq. CHM 1381.*

CHM 1383 Physical Chemistry 3 **3 QH**
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq. CHM 1382.*

CHM 1394 Experimental Physical Chemistry 1 **2 QH**
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq. CHM 1381 or taken concurrently.*

CHM 1395 Experimental Physical Chemistry 2 **2 QH**
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq. CHM 1382 or taken concurrently.*

CHM 1396 Experimental Physical Chemistry 3 **2 QH**
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq. CHM 1383 or taken concurrently.*

CHM 1422 Instrumental Methods of Analysis **4 QH**
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in non-optical spectroscopy. *Prereq. CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.*

CHM 1432 Instrumental Analysis Laboratory **2 QH**
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.

CHM 1441 Inorganic Chemistry **4 QH**
Studies atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq. CHM 1383.*

CHM 1451 Experimental Inorganic Chemistry **2 QH**
Presents topics in modern inorganic and organometallic chemistry. Introduces important experimental techniques. Lab fee. *Prereq. CHM 1441 or taken concurrently.*

CHM 1461 Identification of Organic Compounds **3 QH**
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq. CHM 1265 or CHM 1273.*

CHM 1491, CHM 1492 Directed Study **2 QH each**
Offers independent work under the direction of a faculty member. *Prereq. An organic chemistry sequence,* and *analytical chemistry and departmental approval.*

CHM 1521 Advanced Analytical Chemistry 1 **3 QH**
Examines analytical separations. Corresponds to CHM 3511. *Prereq. CHM 1422 or equivalent.*

CHM 1523 Advanced Analytical Chemistry 2 **3 QH**
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3514. *Prereq. CHM 1422 or equivalent.*

CHM 1525 Advanced Analytical Chemistry 3 **3 QH**
Covers optical methods of analysis. Corresponds to CHM 3513. *Prereq. CHM 1422 or equivalent.*

CHM 1561 Advanced Organic Chemistry 1 **3 QH**
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3566. *Prereq. CHM 1273 or CHM 1265.*

CHM 1562 Advanced Organic Chemistry 2 **3 QH**
Examines organic structure and reactions. Corresponds to graduate course CHM 3666. *Prereq. CHM 1561.*

CHM 1563 Advanced Organic Chemistry 3 **3 QH**
Focuses on organic structure and properties. Corresponds to graduate course CHM 3567. *Prereq. CHM 1562.*

CHM 1564 Spectrophotometric Identification of Organic Compounds **3 QH**
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3569. *Prereq. CHM 1273 or equivalent.*

CHM 1581 Advanced Physical Chemistry 1 **3 QH**
Examines chemical thermodynamics. Corresponds to graduate course CHM 3586. *Prereq. CHM 1383.*

CHM 1591 Advanced Physical Chemistry 2 **3 QH**
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3596. *Prereq. CHM 1383.*

CHM 1738 General Chemistry Laboratory (Honors) **1 QH**
Honors equivalent of CHM 1138.

CHM 1741 General Chemistry 1 (Honors) **4 QH**
Honors equivalent of CHM 1131.

CHM 1742 General Chemistry 2 (Honors) **4 QH**
Honors equivalent of CHM 1132.

CHM 1751 General Chemistry 1 (Honors) **5 QH**
Honors equivalent of CHM 1151.

CHM 1752 General Chemistry 2 (Honors) **5 QH**
Honors equivalent of CHM 1152.

CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research **4 QH each**
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. *Prereq. Middler standing or above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.*

CHM 1811 Advanced Chemical Laboratory Practice 1 **4 QH**
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. *Prereq. CHM 1273, CHM 1395, CHM 1396, CHM 1422, and departmental approval.*

CHM 1812 Advanced Chemical Laboratory Practice 2 **4 QH**
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. *Prereq. CHM 1811 and departmental approval.*

CHM 1840, CHM 1841, CHM 1842, CHM 1843 Junior/Senior Honors Project **4 QH each**
For details contact the honors office.

Communication Studies

CMN 1110 Voice and Articulation **4 QH**
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

CMN 1111 Oral Interpretation of Literature **4 QH**
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.

CMN 1115 Foundations of Communications **4 QH**
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.

CMN 1116 Public Speaking **4 QH**
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.

CMN 1210 Advanced Voice and Articulation **4 QH**
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. *Prereq. CMN 1110.*

CMN 1211 Advanced Oral Interpretation **4 QH**
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. *Prereq. CMN 1111.*

CMN 1232 Communication and Gender **4 QH**
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such as "genderlect," gender bias in language, and gender images communicated in the media.

CMN 1239 Argumentation and Debate **4 QH**
Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. *Prereq. CMN 1116 or permission of instructor.*

CMN 1240 Advanced Studies in Speech Performance **4 QH**
Provides an opportunity to expand skills and strategies in public speaking and debate. Designed for students in the forensic program and for students wishing more in-depth study of public speaking and debate. Emphasizes development of competitively successful approaches to public speaking. *Prereq. CMN 1116 or CMN 1239 or permission of instructor.*

CMN 1250 Introduction to Mass Communication **4 QH**
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.

CMN 1300 Communication Theory **4 QH**
Surveys significant theories of human communication. Emphasizes such topics as systems theory, symbolic interaction theory, structuralist theories, and critical-cultural studies.

CMN 1310 The Classical Age of Speech and Rhetoric **4 QH**
Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.

CMN 1315 Theories of Persuasion **4 QH**
Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.

CMN 1317 The Audience in Mass Communication **4 QH**
Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fanship, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq. CMN 1250.*

CMN 1318 Negotiation Skills **4 QH**
Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq. Middler standing or above or permission of instructor.*

CMN 1330 Interpersonal Communication **4 QH**
Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.

CMN 1331 Advanced Interpersonal Communication **4 QH**
Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq. CMN 1330.*

CMN 1338 Group Discussion **4 QH**
Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.

CMN 1410 Contemporary Public Address **4 QH**
Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.

CMN 1415 Persuasion in Contemporary Culture **4 QH**
Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq. CMN 1315 or permission of instructor.*

CMN 1430 Organizational Communication **4 QH**
Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization.

CMN 1431 Advanced Organizational Communication **4 QH**
Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations. *Prereq. CMN 1430.*

CMN 1437 Consultation Skills **4 QH**
Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. *Prereq. CMN 1115 and CMN 1338.*

CMN 1450 Television Studio Production **4 QH**
Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. *Prereq. CMN 1250 or permission of instructor.*

CMN 1451 Foundations of Broadcast Technology **4 QH**
Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.

CMN 1452 Radio Production **4 QH**
Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. *Prereq. CMN 1250 or permission of instructor.*

CMN 1453 Broadcast Management **4 QH**
Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. *Prereq. CMN 1250 and middler standing or above.*

CMN 1454 Programming for Radio and Television **4 QH**
Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television. *Prereq. CMN 1250.*

CMN 1455 Television Field Production **4 QH**
Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. *Prereq. CMN 1250 and CMN 1450.*

CMN 1500 Special Topics in Communication Studies **4 QH**
Examines various contemporary issues in communication studies. Course content to be posted in communication studies department prior to quarter in which it is offered. *Please consult prior to registering.*

CMN 1554 Special Topics in Media **4 QH**
Examines various contemporary issues in mass media.

CMN 1555 Communication and the Quality of Life **4 QH**
Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. *Prereq. Middler standing, CMN 1330, or permission of instructor.*

CMN 1600 Introduction to Communication Research **4 QH**
Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research.

CMN 1610 Rhetorical Criticism **4 QH**
Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (Core Category V)

CMN 1620 Television Criticism **4 QH**
Offers an advanced communication course where students analyze and evaluate representations of race, class, gender, and the family in television discourse. Aims to increase awareness of the ways that the aural, visual, and aesthetic codes of television work to shape beliefs and values. *Prereq. CMN 1610.*

CMN 1800, CMN 1801, CMN 1802, CMN 1803 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

CMN 1890, CMN 1891, CMN 1892 Directed Study **4 QH each**
Prereq. Permission of instructor.

CMN 1893 Directed Study **1 QH**
Prereq. Permission of instructor.

CMN 1894 Directed Study **2 QH**
Prereq. Permission of instructor.

CMN 1895 Internship in Speech Communication **4 QH**
Gives students the opportunity to gain hands-on experience in the communications industry. Requires prior approval by the internship director prior to registration. Further internship details are available in the department office.

Economics

Courses ECN 1000–1199 are Pathway courses, for which there are no prerequisites. Courses ECN 1200–1299 are required courses with specified prerequisites. Courses ECN 1300–1499 are upper-level elective courses with specified prerequisites; exceptions to these may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives **4 QH**
Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. *Not recommended for students who have completed either ECN 1115 or ECN 1116.* (Core Category II) (Pathway)

ECN 1115 Principles of Macroeconomics **4 QH**
Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (Core Category II) (Pathway)

ECN 1116 Principles of Microeconomics **4 QH**
Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (Core Category II) (Pathway)

ECN 1130 Health Care and Medical Economics **4 QH**
Examines health-care trends in the United States; medical care expenditures; the impact of medical care on health, morbidity, and mortality; CPI and MCPI; the role of gatekeepers; markets for medical care, health insurance, physicians, and nurses; DRGs, HMOs, CONs; the politics of health care; national health insurance; extended care facilities; life care plans; consumer responsibilities; "Date to be 100"; and health-care quality. (Pathway)

ECN 1140 Economics of Crime **4 QH**
Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies. (Core Category VI) (Pathway)

ECN 1150 Economics of World Energy and Primary Resources **4 QH**
Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. (Pathway)

ECN 1170 Economic Issues in Minority Communities **4 QH**
Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (Core Category VI) (Pathway)

ECN 1171 Women in the Labor Market **4 QH**
Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. (Pathway)

ECN 1180 Industrial Organization and Public Policy **4 QH**
Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).* (Pathway)

ECN 1181 Economics of Art and Culture **4 QH**
Presents an overview of the economic aspects of art and culture. Examines the production and consumption of art and culture and the role of the public and private sectors. Topics include: consumer demand, economic models of nonprofit cultural organization, competition and market structure in the arts, artists as

members of the labor force, productivity issues in the performing arts, public support for the arts, and the role and impact of public and private subsidies. (Pathway)

ECN 1190/IAF 1190 The Global Economy **4 QH**
Introduces the history, structure, and growth of the international economy. Considers dimensions of global economic interdependence, including population, foreign investment, and environmental spillovers. Analyzes a few key economic issues of current importance for major regions of the world, such as economic integration in Western Europe or the emergence of the East Asian dragons.

ECN 1191/IAF 1330 Development Economics **4 QH**
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (Core Category V) (Pathway)

ECN 1192 American Economic Development **4 QH**
Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes. (Pathway)

ECN 1193 Economic History of Less Developed Countries **4 QH**
Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250); ECN 1330 recommended.*

ECN 1215 Macroeconomic Theory **4 QH**
Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment, and growth in the light of recent economic history. *Prereq. ECN 1115 or two Pathway courses, and MTH 1114 or equivalent.*

ECN 1216 Microeconomic Theory **4 QH**
Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq. ECN 1116 or two Pathway courses, and MTH 1114 or equivalent.*

ECN 1220 History of Economic Thought **4 QH**
Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1250 Statistics **4 QH**
Discusses basic probability, descriptive statistics, estimation techniques, statistical hypotheses, sampling, analysis or variance, correlation, and regression analysis in the context of economics. Computer applications are an integral part of this course. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*

ECN 1251 Statistics 2 **4 QH**
Studies analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq. ECN 1250. Economics majors who have earned credit for ECN 1251 may not receive credit for MSC 1201.*

ECN 1260 Problems in Economic Research **4 QH**
Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1310 Labor Economics **4 QH**
Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq. ECN 1116 or ECN 1115 or any three economics courses (excluding ECN 1250).*

ECN 1311 Employment and Training Programs and Policies **4 QH**
Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq. ECN 1115 or any three economics courses (excluding ECN 1250).*

ECN 1314 Economics of Education and Human Capital **4 QH**
Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1315 Income Inequalities and Discrimination **4 QH**
Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq. ECN 1115 or ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1320 Urban Economics **4 QH**
Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use

patterns. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1321 Urban Economic Problems and Policies **4 QH**
Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1322 Economics of Transportation **4 QH**
Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1323 Environmental Economics **4 QH**
Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1333 European Economic Development **4 QH**
Discusses economic inheritance of the nineteenth century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed are as in southern Europe; environmental impact of industrialism and the implications of technological society. (Core Category III) (Pathway)

ECN 1334 Comparative Economics **4 QH**
Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1335 International Economics: Finance **4 QH**
Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements, and the international monetary system. *Prereq. ECN 1115 or any three economics courses (excluding ECN 1250) or permission of instructor.*

ECN 1336 International Economics: Trade **4QH**
Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250) or permission of instructor.*

ECN 1340 Government Expenditures: Structure and Evaluation **4 QH**
Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq. ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1341 Financing of Government: Taxation and Debt **4 QH**
Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq. ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1342 Money and Banking **4 QH**
Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq. ECN 1115 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1345 Business Cycles and Inflation **4 QH**
Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1215.*

ECN 1350 Introduction to Econometrics **4 QH**
Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1353 Introduction to Mathematics for Economists **4 QH**
Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1360 Managerial Economics **4 QH**
Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1361 Social Control of Economic Activities **4 QH**
Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1401 Advanced Economic Theory **4 QH**
Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq. ECN 1215 and ECN 1216.*

ECN 1415 Selected Topics in Macroeconomics **4 QH**
Studies macroeconomic issues. *Prereq. Permission of instructor.*

ECN 1416 Selected Topics in Microeconomics **4 QH**
Studies microeconomic issues. *Prereq. Permission of instructor.*

ECN 1481 Directed Study **1 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1482 Directed Study **2 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1483 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1484 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1492 Senior Economics Seminar **4 QH**
Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq. ECN 1216 and ECN 1215; senior economics majors only.*

ECN 1495, ECN 1496, ECN 1497, ECN 1498 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

ECN 1715 Macroeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1116.

Education

ED 1003 Reading/Study Skills 1 **4 QH**
Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2 **4 QH**
Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills **4 QH**
Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-to's of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Human Services and Social Science **4 QH**
Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Introduction to Education **4 QH**
Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Child Development, Learning and Education **4 QH**
Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Adolescent Development, Learning and Education **4 QH**
Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Learning and the Teaching Process **4 QH**
Explores learning and teaching within different types of schools. Examines the pedagogical, environmental, and historical factors that affect the instructional processes and influence educational outcomes.

ED 1106 Creative Expression in Children **4 QH**
Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social

development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq. ED 1102.*

ED 1107 Beginning Computer Use in Education **4 QH**
Introduces students who are unfamiliar with software applications to computer use through general purpose software: word processing and data processing. Covers operating systems commands as well as concepts relating to computer hardware and software. Suggests methods of applying the computer to study requirements in college and to teaching.

ED 1300 Education and Psychosocial Development **4 QH**
Examines theories and research on the socialization functions of education. Covers the relative influence of early versus post-childhood socialization and the role of diverse educational experiences and institutions in personality development. *Prereq. ED 1100 or equivalent.*

ED 1302/HS 1101 The Human Services Professions **4 QH**
Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq. ED 1100, SOC 1100, or equivalent.*

ED 1309/HS 1219 Intervention Strategies for the Human Services **4 QH**
Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment **4 QH**
Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq. PSY 1111 or SOC 1100.*

ED 1318 Seminar in Early Childhood Development **4 QH**
Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq. ED 1102.*

ED 1319 Speech, Language, and Cognition in the Young Child **4 QH**
Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq. ED 1102.*

ED 1405 Teaching Children's Literature and the Arts **4 QH**
Offers a comprehensive survey of the field of children's literature and literature for young adults. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial children's books and, contemporary illustrators. Provides students with the opportunity to learn how to integrate language arts, visual arts, and music in the teaching of literature.

ED 1406 Elementary Education Curriculum 1 **4 QH**
Examines rationales for major curriculum movements in elementary education, emphasizing what current research predicts as reasonable directions to follow. Engages students in different but complementary experiences to demonstrate that an array of teaching strategies enables children to learn in ways compatible for them. Gives particular attention to using sensory approaches via visual art, music, and movement as a basis for integrated program design in all subject areas. Stresses the nature of the thinking processes underlying the activities, and ways to sensitize children to these processes. Team taught by specialists in the arts and a specialist in curriculum. *Prereq. ED 1104.*

ED 1407 Elementary Education Curriculum 2 **4 QH**
Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq. ED 1406.*

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1 **4 QH**
Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq. ED 1104.*

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2 **4 QH**
Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq. ED 1410.*

ED 1412 Fundamentals of Curriculum Development **4 QH**
Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1417 Student Teaching Practicum and Seminar **8 QH**
A 150-clock-hour student practicum and related biweekly seminar. Allows for full-time participation in a University-arranged

and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq. Completion of advanced sequence in early childhood education with minimum of 2.5 QPA.*

ED 1420 Student Teaching Practicum for the Pre-K Setting **4 QH**
A 150-clock-hour student teaching practicum and related biweekly seminar. Offers extensive participation with supervision in a pre-K program. Students analyze learning and teaching and demonstrate, evaluate, and develop teaching skills while working with young children with diverse backgrounds and needs. *Arts and Sciences experiential education requirement. Prereq. Completion of advanced professional sequence in early childhood education with minimum 2.5 QPA.*

ED 1421 Curriculum for the Pre–K Years **4 QH**
Presents theories of active learning and learning through play as applied in the pre-kindergarten years. Offers students the opportunity to learn to specify goals in order to: facilitate children's growth, development, and achievement of skills in communication, inquiry, creative expression, and interpersonal relations; plan, implement, and evaluate content and methodology in various curriculum areas; incorporate developmentally appropriate, integrated learning experiences; select materials and create learning environments; and integrate children with special needs. *Prereq. ED 1102 and ED 1104.*

ED 1423 Multicultural Education **4 QH**
Reviews aspects of the history and culture of different ethnic groups to explore the manner in which certain themes and issues are manifested. Examines and evaluates ethnic and multicultural school curricula in relation to specific educational criteria and goals and their potential impact on learners. Requires students to select and organize historical, literary, and artifact materials from specific ethnic groups and to use them in the planning of learning experiences for classroom use.

ED 1425 Elementary School Mathematics and Science **4 QH**
Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education majors. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Teaching the Language Arts **4 QH**
Emphasizes literacy development in the elementary grades. Presents an integrated language learning perspective drawn from recent research on language and literacy acquisition to serve as the basis for instructional methodology. Students are expected to build an understanding both of how children develop in language, reading, and writing and of language structure that will enable them to make appropriate instructional decisions in the classroom.

ED 1470 Freshman Seminar **1 QH**
Continues work begun in ED 1101, Introduction to Education, in a series of seminars during the winter and spring quarters. Students prepare an educational plan and are introduced to a number of current educational issues.

ED 1480 Junior/Senior Seminar for Education Majors **1 QH**
Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and incorporates advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the teacher's union, teacher certification, graduate school, career issues for women, and alternative careers in education.

ED 1800 Directed Study 1 **4 QH**
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

ED 1801 Directed Study 2 **4 QH**
For students who have completed ED 1800.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013, ENG 1014, and ENG 1111; ENG 1110, ENG 1014, and ENG 1111. For the College of Engineering, ENG 1111 and ENG 1113, and for international students, ENG 1004, ENG 1005, and ENG 1006.

ENG 1004 Fundamentals of English for Non-Native Speakers **4 QH**
Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. Pass/fail grading. *Prereq. Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.*

ENG 1005 English for International Students 1 **4 QH**
Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq. ENG 1004 or special placement.*

ENG 1006 English for International Students 2 **4 QH**
Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq. ENG 1005 or equivalent.*

ENG 1013 Fundamentals of English **4 QH**
Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. Pass-fail grading. *Prereq. Special placement.*

ENG 1110 Freshman English 1 **4 QH**
Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems.

ENG 1111 Freshman English 2 **4 QH**
Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq. ENG 1110.*

ENG 1115 Poetry **4 QH**
Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1116 Fiction **4 QH**
Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1117 Drama **4 QH**
Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1118/LIN 1118 Introduction to Language and Linguistics **4 QH**
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (Core Category II)

ENG 1119/LIN 1119 History of the English Language **4 QH**
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1120 Survey of English Literature 1 **4 QH**
Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1121 Survey of English Literature 2 **4 QH**
Surveys the major British writers and major literary movements from the romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1123 Survey of American Literature 1 **4 QH**
Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1124 Survey of American Literature 2 **4 QH**
Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1125 Technical Writing **4 QH**
Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals and by making oral presentations. *Prereq. ENG 1110 and ENG 1111 and 80 QH.*

ENG 1126 Backgrounds in English and American Literature **4 QH**
Examines in translation Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1218/LIN 1218 Introduction to Language and Linguistics 2 **4 QH**
A workshop that focuses on three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that underlie the linguistic system inside each language user's mind, with a slant toward "doing" linguistics: playing with data, analyzing it, and ultimately explaining it. *Prereq. ENG 1118/LIN 1118 or permission of instructor.*

ENG 1275 Grammar for Journalists **4 QH**
Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. *Prereq. Journalism majors only.*

ENG 1276 Science Fiction **4 QH**
Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1277 Topics in Science Fiction **4 QH**
Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1278 Modern Bestseller **4 QH**
Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1279 The Modern Novel **4 QH**
Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1280 Modern Drama **4 QH**
Studies the development of drama from realism to surrealism, from Ibsen to Beckett. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1281 The Modern Short Story **4 QH**
Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1283 Contemporary Fiction **4 QH**
Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, Morrison, Kingston, and Barth. Emphasizes experimental and modernist authors. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1285 Literature and the Law **4 QH**
Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1286 Literature and Politics **4 QH**
Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1287 The Literature of Science **4 QH**
Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1288 Film and Text **4 QH**
Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era *(Catch-22, The Graduate). Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1289 Shakespeare on Film **4 QH**
Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1290 Topics in Film **4 QH**
Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1293 Topics in Popular Culture **4 QH**
Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1294 Modern Film **4 QH**
Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1300 Topics in Fiction **4 QH**
Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1307 Literary Interpretation **4 QH**
Introduces students to a variety of interpretive methods by studying literary works in different genres—poetry, fiction, and drama—in conjunction with critical texts. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1309 Topics in Literary Criticism **4 QH**
Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop **1 QH**
Emphasizes the writing process: multiple drafts, revision, editing, and publication. Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. *Prereq. 80 QH and Pharmacy, Physical Therapy, or Engineering majors.*

ENG 1350 Intermediate Writing **4 QH**
Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. *Prereq. ENG 1110 and ENG 1111 and 80 QH.*

ENG 1351 Creative Writing **4 QH**
Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1352 Advanced Writing **4 QH**
Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq. ENG 1350 or permission of instructor.*

ENG 1357 Poetry Workshop **4 QH**
Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq. ENG 1351 or permission of instructor.*

ENG 1360 Topics in Writing **4 QH**
An upper-level writing course designed for transfer students who have had transfer credit accepted by Northeastern University, but whose performance on the Introductory Writing Program essay indicates that they would benefit from another course in writing. Taken for elective credit, focuses on reading and writing in an academic context. Requires students to write expository essays that allow them to rehearse a number of different writing strategies as they explore a single topic of their choice (in consultation with the instructor) for the entire term. Students are required to keep a portfolio of all their work (from notes to drafts to final essay), a reading notebook, and a grammar log.

ENG 1361 The Writing Process **4 QH**
Immerses students in the teaching of writing and in the professional literature of writing theory and instruction. Students tutor in the Writing Center and/or other venues as part of their coursework. Ordinarily, students will spend one day a week meeting in class with the instructor, and the rest of their time working and meeting with the instructor outside the classroom. Requires a final paper reflecting on their experience as teachers of writing. *Prereq. ENG 1110 and 1111 or equivalent, and junior standing in the English major.*

ENG 1362 Publication Arts **4 QH**
Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1370 Technical Writing 2 **4 QH**
Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq. ENG 1125 or permission of instructor.*

ENG 1371 Writing for the Computer Industry **4 QH**
Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq. ENG 1125 or permission of instructor and one computer science course.*

ENG 1380 Writing for the Health Professions **4 QH**
Provides an opportunity for students in the health services to develop a recommendation report which incorporates personal experience with academic critique. Students will be required to evaluate scholarly and popular journals in their fields. Includes workshop, editing, and peer review.

ENG 1381 Writing for the Professions: Business Administration **4 QH**
Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1382 Writing for the Professions: Criminal Justice **4 QH**
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1400 Topics in Genre **4 QH**
Explores the characteristics of a particular literary form over time through works by various authors. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1401/LIN 1401 Introduction to Syntax **4 QH**
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (Core Category V) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1402/LIN 1402 Grammars of English **4 QH**
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1407/LIN 1407 Introduction to Semantics **4 QH**
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture? *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1408/LIN 1408 Topics in Linguistics **4 QH**
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1409 American Novels 1 **4 QH**
Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Stowe, Melville, Twain, and James. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1410 American Novels 2 **4 QH**
Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1411 English Drama 1 **4 QH**
Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1412 English Drama 2 **4 QH**
Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1550 Psychology and Literature **4 QH**
Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Wolfe, Faulkner, Conrad, and Lawrence. Same as INT 1707.

ENG 1551 Gender Roles in Literature **4 QH**
Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1552 Fantasy **4 QH**
Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1557 Topics in Fantasy **4 QH**
Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1558, ENG 1559 Literature in Context **4 QH each**
Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the settlement of America. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1600, ENG 1601 Topics in Literature **4 QH each**
Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1602, ENG 1607 Major Figure **4 QH each**
Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1608 The City in Literature **4 QH**
Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1609 Contemporary American Literature **4 QH**
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1610 Early American Literature **4 QH**
Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1611 New England Renaissance **4 QH**
Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience. Includes such writers as Emerson and Thoreau, Hawthorne, Fuller, and Melville. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1612 American Realism **4 QH**
Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Harding, Davis, Howells, Crane, and Norris. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1617 Modern American Literature **4 QH**
Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1618 Children's Literature **4 QH**
Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland, Uncle Remus, Little Women,* and *The Wizard of Oz. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1619 Topics in Children's Literature **4 QH**
Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1621 Nineteenth-Century British Fiction **4 QH**
Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1622 Major Twentieth-Century British Novelists **4 QH**
Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1627 Medieval English Literature **4 QH**
Surveys the major works of medieval English literature. Includes works such as *Sir Gawain, Piers Plowman,* and *Pearl. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1628 Chaucer **4 QH**
Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1629 Topics in Chaucer **4 QH**
Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1630 Milton **4 QH**
Concentrates on Milton's *Paradise Lost,* with supplementary readings in his minor poetry and prose. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1631 Topics in Medieval Literature **4 QH**
Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1632 Sixteenth-Century Literature **4 QH**
Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1637 Seventeenth-Century English Literature **4 QH**
Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1639 Eighteenth-Century English Literature **4 QH**
Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1640 Topics in Eighteenth-Century Literature **4 QH**
Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1641 Romantic Poetry **4 QH**
Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (Core Category V) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1647 Victorian Literature **4 QH**
Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1648 Topics in Victorian Literature **4 QH**
Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1649 World Literature 1 **4 QH**
Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1650 World Literature 2 **4 QH**
Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1652 Twentieth-Century English Literature **4 QH**
Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1658 Introduction to Shakespeare **4 QH**
Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1659 Shakespeare's Comedies **4 QH**
Studies the romantic comedies, problem comedies, and romances, ranging from *The Merchant of Venice* to *The Tempest. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1660 Shakespeare's Tragedies **4 QH**
Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from *Julius Caesar* to *Coriolanus. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1661 Topics in Shakespeare **4 QH**
Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1662 The Bible **4 QH**
Studies books of both the Old Testament and the New Testament as literature and as history. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1667 Modern Poetry **4 QH**
Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and cummings. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1677 Contemporary Poetry **4 QH**
Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1678/AFR 1121 Early African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1679 Modern African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1690, ENG 1691 Junior/Senior Seminar **4 QH each**
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new feminism and the novel, or the canon and its revisions. Emphasizes independent research in a seminar setting. *Prereq. ENG 1110 and ENG 1111 or equivalent and junior/senior status.*

ENG 1692/LIN 1692, ENG 1693/LIN 1693
Junior/Senior Seminar in Linguistics **4 QH each**
Explores important topics in language and linguistics, such as style and meaning or language and gender. Emphasizes independent research in a seminar setting. *Prereq. ENG 1110 and ENG 1111 or equivalent and junior/senior status.*

ENG 1710 Freshman English 1 (Honors) **4 QH**
Honors equivalent of ENG 1110.

ENG 1711 Freshman English 2 (Honors) **4 QH**
Honors equivalent of ENG 1111.

ENG 1721 Survey of English Literature 2 (Honors) **4 QH**
Honors equivalent of ENG 1121.

ENG 1723 Survey of American Literature 1 (Honors) **4 QH**
Honors equivalent of ENG 1123.

ENG 1725 Technical Writing (Honors) **4 QH**
Honors equivalent of ENG 1125.

ENG 1750 Intermediate Writing (Honors) **4 QH**
Honors equivalent of ENG 1350.

ENG 1758 Introduction to Shakespeare (Honors) **4 QH**
Honors equivalent of ENG 1658.

ENG 1781 Writing for Business (Honors) **4 QH**
Honors equivalent of ENG 1381.

ENG 1810, ENG 1811 Directed Study **4 QH each**

Geology

GEO 1119 Marine Resources **4 QH**
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.

GEO 1120 Physical Oceanography **4 QH**
Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.

GEO 1121 Biological Oceanography **4 QH**
Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.

GEO 1122 New England Fishery Resources **4 QH**
Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.

GEO 1128 Geology of Oceans and Coasts **4 QH**
Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (Core Category II)

GEO 1140 Environmental Geology **4 QH**
Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal.

GEO 1141 Geological Hazards and Resources **4 QH**
Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (Core Category II)

GEO 1154 Planetary Astronomy **4 QH**
Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (Core Category V)

GEO 1208 Age of Dinosaurs **4 QH**
Focuses on major physical and biological events of the Mesozoic Era of earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.

GEO 1212 Physical Geology **4 QH**
Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (Core Category II)

GEO 1213 Physical Geology Laboratory **1 QH**
Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq. GEO 1212; may be taken concurrently.*

GEO 1222 Historical Geology **4 QH**
Traces the physical and biological history of the earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (Core Category II)

GEO 1223 Historical Geology Laboratory **1 QH**
Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq. GEO 1222; may be taken concurrently.*

GEO 1250 Advanced General Geology **4 QH**
Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq. GEO 1212 and GEO 1222.*

GEO 1308 Petrology **5 QH**
Studies the hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. *Prereq. GEO 1212.*

GEO 1310 Descriptive Mineralogy **5 QH**
Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq. Two quarters of chemistry.*

GEO 1311 Optical Crystallography **5 QH**
Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq. GEO 1310.*

GEO 1312 Petrography **5 QH**
Covers description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq. GEO 1311.*

GEO 1320 Field Geology **4 QH**
Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq. GEO 1212.*

GEO 1412 Geochemistry **4 QH**
Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq. One year of chemistry.*

GEO 1414 Igneous and Metamorphic Petrology **5 QH**
Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq. GEO 1312.*

GEO 1418 Structural Geology **5 QH**
Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq. GEO 1212 and GEO 1213.*

GEO 1420 Geophysics **4 QH**
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the earth's crust. *Prereq. PHY 1231.*

GEO 1424 Stratigraphy **5 QH**
Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq. GEO 1222.*

GEO 1428 Invertebrate Paleontology **5 QH**
Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates.

GEO 1430 Sedimentation and Sedimentary Environments **5 QH**
Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.

GEO 1432 Sedimentary Petrology **5 QH**
Covers origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq. GEO 1311.*

GEO 1435 Coastal Processes **5 QH**
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq. GEO 1212.*

GEO 1436 Marine Geology **4 QH**
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq. GEO 1212.*

GEO 1438 Geology and Land-Use Planning **4 QH**
Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq. GEO 1140, GEO 1212, or permission of instructor.*

GEO 1440 Geomorphology **5 QH**
Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq. GEO 1212.*

GEO 1442 Environmental Planning **4 QH**
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. (Core Category VI) *Prereq. GEO 1212 or permission of instructor.*

GEO 1444 Glacial and Pleistocene Geology **5 QH**
Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq. GEO 1222.*

GEO 1446 Hydrogeology **4 QH**
Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq. GEO 1212, MTH 1107 or 1123, or permission of instructor.*

GEO 1447 Groundwater Modeling **4 QH**
Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference

method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. *Prereq. Introductory calculus.*

GEO 1448 Groundwater Geochemistry **4 QH**
Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq. Two quarters of chemistry.*

GEO 1450 Geology Seminar **4 QH**
Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq. Major in geology or senior status.*

GEO 1712 Physical Geology (Honors) **4 QH**
Honors equivalent of GEO 1212. (Core Category II)

GEO 1722 Historical Geology (Honors) **4 QH**
Honors equivalent of GEO 1222. (Core Category II)

GEO 1754 Planetary Astronomy (Honors) **4 QH**
Honors equivalent of GEO 1154. (Core Category V)

GEO 1816, GEO 1817 Undergraduate Research **4 QH each**
Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study **4 QH each**
Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies **1 QH each**
Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

History

HST 1101 Western Civilization to 1648 **4 QH**
Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. *Not open to students who have completed HST 1121, HST 1701, or HST 4110.* (Core Category II)

HST 1102 Western Civilization since 1648 **4 QH**
Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. *Not open to students who have completed HST 1122, HST 1702, or HST 4111.* (Core Category II)

HST 1121 World Civilization to 1648 **4 QH**
Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701, or HST 4110.* (Core Category IV)

HST 1122/IAF 1122 World Civilization since 1648 **4 QH**
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102, HST 1702, or HST 4111.* (Core Category IV)

HST 1201 The United States to 1877 **4 QH**
Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (Core Category II)

HST 1202 The United States since 1877 **4 QH**
Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (Core Category II)

HST 1241 The Historian's Craft **4 QH**
Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which he/she works. (Core Category II)

HST 1270 Introduction to Public History **4 QH**
Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1301 Topics in European History (Group A or B) **4 QH**
Covers topics in European history from antiquity to the present.

HST 1321 Medieval Europe (Group A) **4 QH**
Studies Europe from the fall of Rome to the fifteenth century; the expansion of Christianity; the growth of the power of the papacy; the development of monarchies; popular culture, heresy, and witchcraft; crusades; cathedrals, warriors, and saints. Emphasizes cultural and intellectual change. (Core Category III)

HST 1331 Renaissance Civilization (Group A) **4 QH**
Focuses on Europe from 1300 to 1600. Topics include political, economic, and social changes; advances in technology, science, and warfare; overseas expansion; changes in artistic vision; and struggles over religious and scientific beliefs. Emphasizes cultural and intellectual change. (Core Category III)

HST 1355 Tudor England (Group A) **4 QH**
Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World. Provides hands-on experience with Tudor sources.

HST 1390 Population in European History (Group A or B) **4 QH**
Examines, through population studies, the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (Core Category III)

HST 1393 History of Science and Technology (Group A or B) **4 QH**
Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C) **4 QH**
Traces the history of nonpowered flight, beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci; from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1407 Europe, 1870-1921 (Group B) **4 QH**
Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe since 1921 (Group B) **4 QH**
Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

HST 1424 Victorian England (Group B) **4 QH**
Discusses the economic, social, and political life of the English people during Victoria's reign. (Core Category IV)

HST 1425 The Decline of Great Britain (Group B) **4 QH**
Discusses the economic, social, and political life of the English people in the twentieth century. (Core Category IV)

HST 1433 The French Revolution and Napoleon (Group B) **4 QH**
Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.

HST 1441 Hitler's Germany (Group B) **4 QH**
Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.

HST 1472 The Family in European History (Group B) **4 QH**
Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.

HST 1473 Women in Modern Europe (Group B) **4 QH**
Examines the history of women in Western Europe from the French Revolution of 1789 to the present, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.

HST 1481 The Culture of Europe (Group B) **4 QH**
Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (Core Category III)

HST 1485 Communism and Revolution (Group B) **4 QH**
Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490/INT 1150/SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C) **4 QH**
Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies

minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. (Core Category II)

HST 1491 Modern Western Economic History (Group B or C) 4 QH
Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (Core Category III)

HST 1493 Work and Leisure (Group B or C) 4 QH
Examines the historical evolution of contemporary patterns of work and leisure across cultural, sexual, and class lines. Topics include the impact of machine technology on the worker and the workplace, workers organizing in unions and professional groups, changing concepts of the use of time, women's work and women's leisure; recreation and sports (both participant and spectator); and the rise of the cafe and the saloon as sociable institutions. (Core Category III)

HST 1494 History and Film (Group B or C) 4 QH
Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (Core Category II)

HST 1495 Technological Transformations of Society (Group B, C, or D) 4 QH
Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.

HST 1496 War in the Twentieth Century (Group B, C, or D) 4 QH
Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World since 1945 (Group B, C, or D) 4 QH
Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C) 4 QH
Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C) 4 QH
Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (Core Category III)

HST 1511 The American Revolution (Group C) 4 QH
Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C) 4 QH
Focuses on the events surrounding the southern effort to expand slavery into the territories which led to the Civil War. Emphasizes the significant impact of Abraham Lincoln upon the war's outcome. Also examines Reconstruction, the effort to reunite the North and South at war's end, and explores the major role that African-Americans played throughout the period.

HST 1516 The United States, 1898-1939 (Group C) 4 QH
Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939-1960 (Group C) 4 QH
Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States since 1960 (Group C) 4 QH
Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525/AFR 1131 African-American History 1 to 1900 (Group C) 4 QH
Covers the development of black America from slavery through the Booker T. Washington–W.E.B. DuBois controversy, with emphasis on the historical links between Africa and America that have shaped the African-American experience. Includes in-depth discussion of slavery's impact, the role of the antebellum free black, the Civil War and Reconstruction, and the black response to the new racism of the late nineteenth century. (Core Category III)

HST 1526/AFR 1132 African-American History 2 since 1900 (Group C) 4 QH
Examines the modern development of black America, with major emphasis on the twentieth century and the rising tide of African-American nationalism. Provides an historical perspective regarding key contemporary issues, including the founding of the NAACP, the Marcus Garvey back-to-Africa movement, the Harlem Renaissance, the Black Muslims, the impact of Martin Luther King, and the idea of Black Power.

HST 1531 New England History (Group C) 4 QH
Examines the history of New England from its first settlement by Native Americans to its condition in the late twentieth century. Encompasses a variety of topics, including geography, discovery, exploration, settlement, immigration, politics, industrialization, transportation, and urbanization.

HST 1533 History of Boston (Group C) 4 QH
Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

HST 1538 History of Latinos(-as) in the United States (Group C) 4 QH
Examines the history and experiences of the major Latino subgroups—Chicanos, Cubans, and Puerto Ricans—and the new immigrants from Central America and the Caribbean. Studies historical events in the context of the larger "American"—North and South—experiences. Topics include United States' expansion and imperialism in the Southwest and the Caribbean; migration patterns; forms of ethnic nationalism; political participation and mobilization; migratory labor and immigration policies; gender and class distinctions; cultural expressions; the effects of post-industrialization and economic restructuring; and interethnic relations.

HST 1539 American Jewish History (Group C) 4 QH
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.

HST 1543 American Urban History (Group C) 4 QH
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (Core Category VI)

HST 1544 Environmental History of the United States (Group C) 4 QH
Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (Core Category VI)

HST 1548 American Cultural History to 1860 4 QH
Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.

HST 1549 American Popular Cultural History since 1860 4 QH
Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of advertising and consumerism, technological change and its meaning, the rise of sports, suburban life from the 1950s onward, 1960s "counter culture," and neo-conservatism. Emphasizes the interaction of a wide range of cultural forms, including popular literature and music, film, television, and the mail order catalog.

HST 1553 The Family in American History (Group C) 4 QH
Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.

HST 1554 Women in America (Group C) 4 QH
Offers an analysis of women's economic and social roles from the colonial period to the present, with special attention to women's work, their roles in family and community, and nineteenth- and twentieth-century women's rights movements. (Core Category III)

HST 1555 American Elites (Group C) 4 QH
Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.

HST 1556 History of the American Home (Group C) 4 QH
Studies the American home from 1600 to the present. Extensively uses visual materials to develop an above-ground "archeology" of the American home to teach students how things—furnishings, buildings, landscape—contain hidden meanings that can reveal the intimate details of the everyday lives of ordinary and extraordinary Americans. Includes analysis of the ways in which the broader political, economic, and social issues of the past were reflected in Americans' physical surroundings.

HST 1563 History of Sport in America (Group C) 4 QH
Provides a history of the major sports and their impact on American life.

HST 1575 History of Media in America (Group C) 4 QH
Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.

HST 1577 America and the Sea (Group C) 4 QH
Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

HST 1578 The Automobile in America (Group C) 4 QH
Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.

HST 1581 The Gilded Age and the Progressive Era, 1877–1920 4 QH
Examines the transformation of American society and its economy and analyzes how government responded to these sweeping changes from the 1870s through World War I.

HST 1582 The Growth of American Government Since 1935 (Group C) 4 QH
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.

HST 1586 American Military History (Group C) 4 QH
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.

HST 1591 American Images of China (Group C or D) 4 QH
Examines the relationship between Sino-American international relations and changes in American popular perceptions of China as revealed in the media and literature. Focuses on Sino-American relations since the nineteenth century, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.

HST 1592 History of the Vietnam War (Group C or D) 4 QH
Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.

HST 1601 Canadian History (Group D) 4 QH
Explores the history of Canada from the time of the arrival of the First Nations to the present, with emphasis on Canadian relations with the United States and on the background of the Quebec separatist movement.

HST 1604 Latin America: The Modern Period (Group D) 4 QH
Traces the developments in this region since independence and the inception of nationhood. Topics include: state formation and society in the nineteenth century; economic development and

underdevelopment in the region; race, class, and ideology; United States/Latin American relations; populism; the roots of revolution and authoritarianism; and the contemporary experiments with neo-liberal policies.

HST 1605 Introduction to Caribbean History (Group D) **4 QH**
Focuses on the social, economic, and cultural forces that have shaped the character of the Caribbean people. Examines the variety of societies, cultures, and institutions of the region in their historical and contemporary settings, beginning with pre-Colombian cultures, moving through the colonial period, plantation agriculture, slavery, the expansion of U.S. influence, urbanization, economic development models, authoritarian politics, and the contemporary migration of Caribbean people to the United States and Europe.

HST 1610 Topics in Asian History (Group D) **4 QH**
Covers special topics in the history of Asia.

HST 1612 The Modern Middle East (Group D) **4 QH**
Focuses on the Middle East since 1800, with emphasis on the background of present problems. (Core Category VI)

HST 1613 The Contemporary Middle East (Group D) **4 QH**
Focuses on political, economic, and social developments in the Middle East since World War II.

HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D) **4 QH**
Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.

HST 1620/AFR 1191 Early African Civilization (Group D) **4 QH**
Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800.

HST 1621/AFR 1197 Modern African Civilization (Group D) **4 QH**
Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. (Core Category IV)

HST 1623/AFR 1403 West African History (Group D) **4 QH**
Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria.

HST 1625/AFR 1405 South African History (Group D) **4 QH**
Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting.

HST 1633 Modern China (Group D) **4 QH**
Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.

HST 1634 Contemporary China (Group D) **4 QH**
Examines Chinese polity, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.

HST 1637 The Making of Modern Japan: From Samurai to Sony (Group D) **4 QH**
Surveys the evolution of Japan from a third-world nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.

HST 1652 Islam Resurgent (Group D) **4 QH**
Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (Core Category VI)

HST 1701 Western Civilization 1 (Honors) **4 QH**
Honors equivalent of HST 1101.

HST 1702 Western Civilization 2 (Honors) **4 QH**
Honors equivalent of HST 1102.

HST 1711 America to 1877 (Honors) **4 QH**
Honors equivalent of HST 1201.

HST 1712 America since 1877 (Honors) **4 QH**
Honors equivalent of HST 1202.

HST 1790 Population in European History (Group A or B) (Honors) **4 QH**
Honors equivalent of HST 1390.

HST 1801 Directed Study **4 QH**

HST 1805 Senior Research Seminar **4 QH**
The capstone course of the undergraduate history major. Gives students an opportunity to pursue a major research project of their own choosing under the close supervision of faculty. Emphasizes the techniques of research and interpretation of research findings. Gives special attention to methodology and to the incorporation of methodological perspectives in research and writing.

HST 1811, HST 1812, HST 1813, HST 1814 **4 QH each**
Junior/Senior Honors Program
For details contact the honors office.

HST 1821 Fieldwork in History 1 **4 QH**
Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. *Prereq. HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses. College of Arts and Sciences experiential education requirement.*

Human Services

HS 1101/ED 1302 The Human Services Professions **4 QH**
Explores what a human service agency is, how it comes into being, and how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq. ED 1100, SOC 1100, or equivalent.*

HS 1210/ED 1309 Intervention Strategies for the Human Services **4 QH**
Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

HS 1240/SOC 1240 Sociology of Human Service Organizations **4 QH**
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

HS 1260/SOC 1324 Human Services Research and Evaluation **4 QH**
Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethic formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq. SOC 1320 or other statistics, SOC 1240, or permission of instructor.*

HS 1333 Senior Seminar in Human Services **4 QH**
Designed for seniors in human services. Examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

HS 1336, HS 1337 Field Internship in Human Services 1 and 2 **6 QH each**
Human services students are required to fulfill two internship placements during the last two years of their program. Each placement consists of 150 hours on-site and generally varies according to the students' interests. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. *College of Arts and Sciences experiential education requirement. Prereq. Junior or senior standing and approval by the Human Services Internship coordinator by early in quarter previous to planned quarter of internship.*

Interdisciplinary Courses

INT 1121/LNS 1121/SOA 1121 **4 QH**
Introduction to Latino, Latin American, and Caribbean Studies
Offers an interdisciplinary introduction to Latinos and people of Latin American and Caribbean origin in the United States as well as to the regions of Latin America and the Caribbean. Dispels a series of powerful myths associated with U.S. Latinos and in Latin American and Caribbean society, such as racial inferiority, poverty, machismo, and violence. Introduces the construction of Latino, Latin American, and Caribbean identities as well as the politics, economics, history, and culture.

INT 1150/SOC 1150 **4 QH**
Introduction to Women's Studies: Image, Myth, and Reality
Surveys the issues and methodologies involved in the interdisciplinary study of women. Examines the political, economic, social, and historical processes that have created both the image and the reality of women in societies. Guest lecturers provide an overview of the diverse disciplinary approaches to the study of women. (Core Category II)

INT 1201 An Analysis of American Racism **4 QH**
Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World **4 QH**
Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. A comprehensive interdisciplinary introduction to the oceans. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq. Permission of instructor.*

INT 1216 A History of Seafaring **4 QH**
Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq. Permission of instructor.*

INT 1217 Water: Planning for the Future **4 QH**
Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems in all their dimensions—political, economic, and technological. Same as SOC 1150. *Prereq. Permission of instructor.* (Core Category VI)

INT 1219 Advanced Seminar in Marine Studies **4 QH**
Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines, including scientific, legal, economic, and technical

aspects of issues, that come into play in marine affairs. Seminars are lead by experts actively involved in the issues.

INT 1220 Coastal Issues Seminar **4 QH**
Focuses on outstanding issues in coastal environmental affairs. Discusses scientific, legal, economic, and technical aspects of coastal issues, and integrates them into problem-solving exercises. *Prereq. Permission of instructor.*

INT 1302 Feminist Perspectives on Society **4 QH**
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that analyzes issues affecting women's health and safety, including violence against women and abortion. Considers and evaluates women's views of social life and recognizes differences among women, including perspectives of women of color. (Core Category VI)

INT 1320 Exploring the Humanities Through Film **4 QH**
Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents films for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (Core Category II)

INT 1321 Modernism: Art, Film, and Literature **4 QH**
Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies Futurism, Cubism, Expressionism, Dada, and Surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film. Research paper or creative project due at the end of the term.

INT 1570 On Understanding Science **4 QH**
Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications **4 QH**
Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq. BIO 1261.*

INT 1702 War Work: The Experience of World War II (Honors) **4 QH**
Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1707/ENG 1550 Psychology and Literature (Honors) **4 QH**
Examines literature from a psychoanalytic perspective. Topics include Freud's theories, object relations, Lacan's theories, and Kohut's self-psychology. Discusses works by Charles Dickens, Franz Kafka, Virginia Woolf, Doris Lessing, and Anne Tyler.

INT 1709 Cultural Passages in the Arts—Boston **4 QH**
Exposes students to the richness of the Boston cultural environment through a directed field study with various Northeastern University faculty. Students will be required to keep a detailed journal and produce a final creative project. Field trips will include various museums, theaters, and some neighborhoods within the city of Boston.

INT 1710 Italy (Honors) **4 QH**
Honors interdisciplinary seminar on the history, art and modern culture of Italy with a primary focus on Pisa and Florence.

INT 1715 Iceland (Honors) **4 QH**
Honors interdisciplinary seminar on the history, Nordic literature, and geology of Iceland.

INT 1721 Modernism: Art, Film, and Literature (Honors) **4 QH**
Honors equivalent of INT 1321.

International Affairs

IAF 1100 Introduction to International Affairs **4 QH**
Introduces the study of international affairs through lectures, guest lectures, discussions, case studies, films, and readings across disciplines. Provides students with a basis for understanding the global village. Covers a range of issues including politics, economics, history, society and culture, and the environment.

IAF 1104/SOA 1104 Cultures of the World **4 QH**
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (Core Category II)

IAF 1112/POL 1112 Introduction to International Relations **4 QH**
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (Core Category II)

IAF 1113/POL 1113 Introduction to Foreign Governments **4 QH**
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

IAF 1122/HST 1122 World Civilization Since 1648 **4 QH**
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of the American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. (Core Category IV)

IAF 1190/ECN 1190 The Global Economy **4 QH**
Introduces the history, structure, and growth of the international economy. Considers dimensions of global economic interdependence, including population, foreign investment, and environmental spillovers. Analyzes a few key economic issues of current importance for major regions of the world, such as economic integration in Western Europe or the emergence of the East Asian dragons.

IAF 1300 International Conflict and Negotiation **4 QH**
Introduces students to the dynamics of conflict in the international arena: how conflicts evolve, fester, and are managed and resolved. Covers different types of regional and international conflicts, focusing on historical, economic, social, and political aspects of a variety of conflicts and the consequences they hold for regional and international actors. (Core Category V)

IAF 1330/ECN 1191 Development Economics **4 QH**
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (Core Category V)

IAF 1400 International Experience Workshop **4 QH**
Provides an opportunity for students who have completed their International Experience requirement for the major or minor in international affairs to participate in a workshop coordinated by a faculty member of the program. Students will prepare materials for the class relating to the political, social, economic, historical, and cultural aspects of the countries where they have studied, worked, or interned. (This course is open to other students who have comparable international experience.)

IAF 1870 Senior Seminar in International Affairs **4 QH**
Develops one or two main topics to be decided by the instructor in consultation with faculty and students in the International Affairs program. Topics, which will vary from year to year, may include, for example, emerging economies, world trade, arms control, and global stability.

Journalism

JRN 1103 Newswriting 1 **4 QH**
Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required.

JRN 1104 Newswriting 2 **4 QH**
Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq. JRN 1103 with grade of C or better.*

JRN 1105 Computer-Assisted Reporting **4 QH**
Introduces novices to the computing skills needed by today's journalists, yet holds sufficient challenges for those who have already found their way onto the World Wide Web. Presents material in two sections. Part one, Using the Internet, contains parallel study of using the Internet to enhance news stories published in familiar formats such as newspaper, magazine, radio, and television, and using the Internet to publish material. Part two, Database Computer Skills for Journalists, focuses on the many sources of information available via computer that can be reconfigured to help reporters research and write a news story. *Prereq. JRN 1103 with grade of C or better.*

JRN 1206 Editing **4 QH**
Provides practice in copy editing, headline writing, and origination editing. Presents assignments in photo selection, cropping, and cutline writing. Introduces page layout. Students may fulfill their experiential learning requirement by working on school and parent newspapers and newsletters with neighborhood public schools and writing a paper evaluating the experience. *Prereq. JRN 1104 with grade of C or better and middler status.*

JRN 1250 Interpreting the Day's News **4 QH**
Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (Core Category VI) *For nonmajors as well as majors.*

JRN 1301 Basic Photojournalism **4 QH**
Covers camera and darkroom procedures along with cropping, assignment techniques, theory, and photo caption methods.

JRN 1305 Techniques of Journalism **4 QH**
Provides practice in writing in-depth and multiplesource stories requiring significant research. Provides an introduction to investigative reporting, practice in feature writing, and a review of legal issues. *Prereq. JRN 1104.*

JRN 1320 Radio News Gathering and Reporting **4 QH**
Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq. JRN 1103.*

JRN 1336 Public Relations Principles **4 QH**
Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq. Upperclass standing.*

JRN 1350 Advertising Principles **4 QH**
Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq. Upperclass standing.*

JRN 1421 Television Newswriting **4 QH**
Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq. JRN 1103, with a grade of C or better, or permission of instructor.*

JRN 1422 Television News Production **4 QH**
Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq. JRN 1421.*

JRN 1423 Documentary Production **4 QH**
Has two principle emphases: 1) provides students with an opportunity to research and produce short video documentaries and 2) acquaints students with a range of professional documentary work through screenings and discussions. Working either individually or in collaboration with up to two other class members, students will have the opportunity to propose, research, shoot, write, and edit video documentary projects that will be screened at the end of the quarter. *Prereq. JRN 1422 or permission of instructor.*

JRN 1432 Local Reporting **4 QH**
Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq. JRN 1104 with a grade of C or better.*

JRN 1440 Design and Graphics **4 QH**
Applies layout and design principles to newspapers, magazines and other print media. Covers type faces, copy measuring, dummying, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq. JRN 1206.*

JRN 1451 Advertising Copy Writing **4 QH**
Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail. Emphasizes fact gathering, copy structure, and advertising design. *Prereq. JRN 1103, and JRN 1350, or permission of instructor.*

JRN 1460 Public Relations Problems **4 QH**
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq. JRN 1336.*

JRN 1501 History of Journalism **4 QH**
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq. Upperclass standing.*

JRN 1508 Law of the Press **4 QH**
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq. Upperclass standing.*

JRN 1512 Journalism Ethics and Issues **4 QH**
Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required. *Prereq. Upperclass standing.*

JRN 1522 Magazine Writing **4 QH**
Covers writing and free-lancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq. JRN 1104, with a grade of C or better.*

JRN 1552 Advertising Practice **4 QH**
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq. JRN 1451.*

JRN 1561 Public Relations Practice **4 QH**
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq. JRN 1103 and JRN 1336.*

JRN 1703 Newswriting 1 (Honors) **4 QH**
Honors equivalent of JRN 1103.

JRN 1704 Newswriting 2 (Honors) **4 QH**
Honors equivalent of JRN 1104.

JRN 1870, JRN 1880 Seminar **4 QH each**
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq. Upperclass standing.*

JRN 1891 Directed Study in Journalism **4 QH**
Prereq. Permission of instructor.

JRN 1892 Topics: Beat Reporting **4 QH**
Prereq. Permission of instructor.

JRN 1894, JRN 1895, JRN 1896, JRN 1897 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

JRN 1899 Advanced TV Production **4 QH**
Provides students with guidance in the development of special projects in television and video production. Studies advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and post-production technology. Students involved in the Northeastern Student Network project may also receive credit. *Prereq. Permission of instructor.*

Linguistics

LIN 1118/ENG 1118 Introduction to Language and Linguistics 1 **4 QH**
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (Core Category II)

LIN 1119/ENG 1119 History of the English Language **4 QH**
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills/journals, and private and public letters. *Prereq. ENG 1110, ENG 1111, or equivalent.* (Core Category III)

LIN 1215/PHL 1215 Symbolic Logic **4 QH**
Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (Core Category II)

LIN 1218/ENG 1218 Introduction to Language and Linguistics 2 **4 QH**
A workshop that focuses on three core areas in the study of language: syntax, morphology and phonology. Examines the regularities that underlie the linguistics system inside each language user's mind, with a slant toward "doing" linguistics: working with data, analyzing it, and ultimately explaining it. *Prereq. LIN 1118/ENG 1118 or permission of instructor.*

LIN 1220/LNL 1220 Introduction to Phonetics and Phonology **4 QH**
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LIN 1231/AFR 1231 African-American English **4 QH**
Addresses topics in the study of African-American English. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in the educational context.

LIN 1235/LNL 1235 Applied Linguistics **4 QH**
Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LIN 1240/LNL 1240 Bilingualism **4 QH**
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LIN 1245/LNF 1250 History of the French Language **4 QH**
Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq. Reading knowledge of French or permission of instructor.*

LIN 1250/ASL 1250 Linguistics of American Sign Language **4 QH**
Introduces the basic issues of linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq. ENG 1118 and the ability to follow lectures in ASL.*

LIN 1255/LNS 1250 History of the Spanish Language **4 QH**
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of Old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LIN 1260/LNL 1260 Introduction to Romance Linguistics **4 QH**
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronoun use. Conducted in English. *Prereq. Reading knowledge of one Romance language or permission of instructor.*

LIN 1262/PSY 1262 Psychology of Language **4 QH**
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

LIN 1263/PSY 1263 Nonverbal Communication **4 QH**
Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq. PSY 1112 or PSY 1113.*

LIN 1335/SOA 1335 Language and Culture **4 QH**
Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and creoles. Includes several field assignments.

LIN 1362/PSY 1362 Child Language **4 QH**
Examines how language develops in children. *Prereq. LIN 1118, PSY 1262 or permission of instructor.*

LIN 1364/PSY 1364 Cognition **4 QH**
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

LIN 1365/PSY 1365 Language and the Brain **4 QH**
Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq. PSY 1262 or permission of instructor.*

LIN 1401/ENG 1401 Introduction to Syntax **4 QH**
Offers an introduction to the mental rules that speakers of any language unconsciously follow when they combine words into meaningful sentences and when they decode the strings of sounds that they hear every day. Examines sentence structure, syntactic principles, universal grammar, and innateness in a Chomskyan generative framework. (Core Category V)

LIN 1407/ENG 1407 Introduction to Semantics **4 QH**
Focuses on meaning and how it is expressed in language through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what way is linguistic meaning determined by our perceptual system or our culture?

LIN 1408/ENG 1408 Topics in Linguistics **4 QH**
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.

LIN 1415/AFR 1415 African Language **4 QH**
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

LIN 1440/PHL 1440 Philosophy of Language **4 QH**
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quoin, Russell, Chomsky, and Fodor. *Prereq. Permission of instructor.*

LIN 1499/PSY 1499 Psychology of Reading **4 QH**
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq. PSY 1262 or PSY 1364.*

LIN 1562/PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1261 or PSY 1364.*

LIN 1564/PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1354 or PSY 1262.*

LIN 1661/PSY 1661 Seminar in Psycholinguistics **4 QH**
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1662/PSY 1662 Seminar in Cognition **4 QH**
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1692 Seminar in Linguistics **4 QH**
Specific topics vary by quarter.

LIN 1693 Seminar in Linguistics **4 QH**
Specific topics vary by quarter.

LIN 1801 Directed Study **1 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1802 Directed Study **2 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1803 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1804 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

Mathematics

MTH 1000 Mathematics Preliminaries 1 **4 QH**
Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; operations on polynomials; solving simple first degree equations; and laws of exponents. *Prereq. Permission of course coordinator.*

MTH 1010 Mathematics Preliminaries 2 **4 QH**
Supplies, together with MTH 1000, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes solving first and second degree equations and systems of equations; graphic lines and parabolas; solving equations with algebraic fractions; solving word problem applications. *Prereq. Permission of course coordinator.*

MTH 1101 Applications of Algebra **4 QH**
Examines linear equations and their graphs, and systems of linear equations and linear inequalities in two variables, with application to linear programming. Introduces matrices with application

to Markov chains; set theory, techniques of counting; permutations and combinations and elementary probability. (Core Category I)

MTH 1102 Interactive Mathematics **4 QH**
Offers hands-on exploration of real-life situations, developing concepts from algebra, statistics, and linear programming as needed. Emphasizes problem-solving strategies. Designed for students who enjoy working in collaborative groups. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Core Category I).

MTH 1103 Basic Probability **4 QH**
Covers introduction to probability, sample spaces with equiprobable events, permutations and combinations, conditional probability. Also discusses random variables, introduction to Markov processes. (Equiv. to MTH 1150.)

MTH 1106 Functions and Algebra **4 QH**
Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane. *Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.*

MTH 1107 Functions and Basic Calculus **4 QH**
Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (Core Category I) *Prereq. MTH 1106. Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.*

MTH 1108 Basic Calculus 2 **4 QH**
Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations. *Prereq. MTH 1107.*

MTH 1113 College Mathematics for Business and Economics **4 QH**
Focuses on sets, rectangular coordinates and graphs, functions and functional notation; linear, exponential, and logarithmic functions. Studies permutations and combination, elementary probability concepts, and simple and compound interest annuities. A graphing calculator is required for this course; the TI-83 is strongly recommended.

MTH 1114 Calculus for Business and Economics **4 QH**
Studies functions, derivatives, differential of polynomials, exponential functions and logarithmic functions; graphics functions using maximum, minimum, inflection points; and optimization in nonlinear problems; marginal analysis of cost, revenue, profit functions. Emphasizes work problems and applications. A graphing calculator is required for this course; the TI-83 is strongly recommended. *Prereq. MTH 1113 or equivalent. Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2 **6 QH each**
Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1 **4 QH**
Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2 **4 QH**
Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. *Prereq. MTH 1123.*

MTH 1125 Calculus for Engineering Majors 3 **4 QH**
Introduces Taylor polynomials and series; studies differential equations and mathematical models. *Prereq. MTH 1124.*

MTH 1133 Calculus for Life Sciences 1 **4 QH**
Begins with the fundamentals of differential calculus and proceeds to specific problems encountered in biological research. Studies the formulation of physiological problems in terms of differential equations; solutions of differential equations by method of undetermined coefficients; and application to compartmental problems.

MTH 1134 Calculus for Life Sciences 2 **4 QH**
Studies integral calculus; trigonometric functions; solutions of differential equations by separation of variables; and advanced compartmental problems. Introduces pharmaco-kinetics, numerical integration, and Euler's method. *Prereq. MTH 1133.*

MTH 1135 Calculus for Life Sciences 3 **4 QH**
Presents functions of several variables, Taylor polynomials, and infinite series. *Prereq. MTH 1134.*

MTH 1137 Discrete Mathematics **4 QH**
Covers logic, binary arithmetic, basis set theory, Boolean algebra, and logic gates and their close interconnections. Also studies functions, permutations, combinatorics, proof by induction, algorithms, recursion, and recurrence relations. *Prereq. MTH 1123.*

MTH 1140 Calculus for Science Majors 1 **4 QH**
Presents introductory calculus primarily for mathematics, physics, and chemistry majors. Together with MTH 1141 and MTH 1142, includes derivatives and integrals of one-variable functions; applications to curve sketching, maxima and minima problems, area, moments, simple volumes, etc.; approximation methods, including numerical integration, root finding, Taylor series, and power series; introduces differential equations. Requires students to master the use of the computer to make value tables and plot curves and to implement simple numerical algorithms.

MTH 1141 Calculus for Science Majors 2 **4 QH**
Continues MTH 1140. *Prereq. MTH 1140.*

MTH 1142 Calculus for Science Majors 3 **4 QH**
Continues MTH 1141. *Prereq. MTH 1141.*

MTH 1150 Probability, Statistics, and the Computer **4 QH**
Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. (Equivalent to MTH 1103.) *Prereq. Nonmath majors.*

MTH 1152 Statistical Thinking **4 QH**
Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings from a wide variety of sources. Uses extensive class discussion and homework problems to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (Core Category II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1170 Mathematical Discovery and Computers **4 QH**
Introduces the computer as a tool for mathematical discovery as well as an object of study. Both the mathematical and computer components may vary, but there will always be an emphasis on the nature of mathematical exploration and the solving of challenging problems.

MTH 1183 Mainstreams of Mathematics **4 QH**
Traces the development of some key mathematical ideas, their historical context, and current applications. May include mathematical games and puzzles; number systems past and present; logic and computers; calculus and the rise of modern science, art, and symmetry; and cut-and-paste topology. Assumes no more than high school algebra and geometry. Encourages students with diverse backgrounds to rediscover mathematics through individual projects, supplemental readings, and classroom discussions.

MTH 1188 Problem Solving and Pre-Calculus 1 **6 QH**
Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions. A graphing calculator is required for this course; the TI-83 is strongly recommended. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2 **6 QH**
Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Equivalent to MTH 1192.)

MTH 1191 College Algebra **4 QH**
Focuses on fundamental algebraic operations, complex numbers, radicals and exponents, functions, linear and quadratic equations, irrational equations, inequalities, variation, and roots of polynomial equations. A graphing calculator is required for this course; the TI-83 is strongly recommended. *Prereq. BSET majors only. Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus **4 QH**
Focuses on logarithms, trigonometric functions of angles in degrees and radians, trigonometric identities and equations, right triangles, oblique triangles, complex numbers in trigonometric form, systems of equations, and determinants. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Equivalent to MTH 1189.) *Prereq. MTH 1191 or MTH 4107; BSET majors only.*

MTH 1193 Calculus 1 **4 QH**
Focuses on plane analytic geometry; differentiation of algebraic functions; rate, motion, maximum and minimum problems; derivatives of higher order; curve sketching; basics in functions, limits, and continuity. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Not equivalent to MTH 1123.) *Prereq. MTH 1192 or MTH 4108; BSET majors only.*

MTH 1194 Calculus 2 **4 QH**
Focuses on applications of derivatives to curve sketching; antidifferentiation; the definite integral, with applications; calculus of nonalgebraic functions — logarithmic, exponential, and trigonometric; calculus of inverse trigonometric functions; techniques of integration; indeterminate forms; and L'Hopital's rule. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Not equivalent to MTH 1124.) *Prereq. MTH 1193 or MTH 4120; BSET majors only.*

MTH 1195 Calculus 3 **4 QH**
Focuses on polar coordinates, vectors in a plane, calculus of functions of several variables, partial differentiation, multiple integrals, infinite series, vector analysis, and introduction to differential equations. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Not equivalent to MTH 1125.) *Prereq. MTH 1194 or MTH 4121; BSET majors only.*

MTH 1203 History of Mathematics **4 QH**
Traces the development of the various branches of mathematics from ancient times to the present, with emphasis on the mathematics itself as well as the mathematicians and cultures that produced it. Teaches students to compute in other number systems, to perform geometric constructions, and to learn proofs of some significant theorems. (Core Category III) *Prereq. Interest in history and mathematics.*

MTH 1212 Linear Programming **4 QH**
Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (Core Category II) *Prereq. One year of college mathematics.*

MTH 1223 Calculus for Engineering Majors 4 **4 QH**
Covers partial derivatives and multiple integrals, with applications. *Prereq. MTH 1125.*

MTH 1225 Differential Equations (Engineering) 1 **4 QH**
Studies ordinary differential equations with applications including mechanical vibrations and electrical circuits. Focuses on first-order equations and systems and second-order linear equations studied from various points of view: existence theory, analytic solution techniques (including Laplace transform), and numerical methods. Uses computer labs for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1226 Differential Equations (Engineering) 2 **4 QH**
Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq. MTH 1245 or equivalent.*

MTH 1230 Linear Algebra for Engineers **4 QH**
Introduces matrices through Guassian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq. MTH 1225.*

MTH 1238 Combinatorial Mathematics **4 QH**
Introduces techniques of mathematical proofs, including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion, Polyaenumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq. Two courses in calculus.*

MTH 1240 Chaos and Fractals **4 QH**
Presents an experimental study, using simple mathematical models, of chaotic behavior in dynamical systems found in mathematics, science, and computer science. Goals include the development of experimental skills, integration of visual and analytical modes of thought, and an appreciation of issues of problem formulation and representation. *Prereq. MTH 1125, MTH 1137, and COM 1201 or equivalent.*

MTH 1243 Calculus for Science Majors 4 **4 QH**
Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq. MTH 1142.*

MTH 1244 Calculus for Science Majors 5 **4 QH**
Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq. MTH 1243.*

MTH 1245 Differential Equations (Science) 1 **4 QH**
Studies ordinary differential equations with applications. Focuses on first-order equations and systems and second-order linear equations studied from various points of view: existence theory, analytic solution techniques, and numerical methods. Introduces linear algebra, including eigenvalues and eigenvectors to study systems of equations. Uses computer labs for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1246 Differential Equations (Science) 2 **4 QH**
Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1301 Linear Algebra 1 **4 QH**
Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq. MTH 1244 or equivalent.*

MTH 1302 Linear Algebra 2 **4 QH**
Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq. MTH 1301.*

MTH 1311 Real Analysis 1 **4 QH**
Provides the theory and technique for a rigorous treatment of calculus. Topics vary and may include the construction of the real numbers, continuity and convergence, differentiation and integration, and proofs of selected results such as the inverse and implicit function theorems. Emphasizes careful proofs throughout. *Prereq. MTH 1137 or permission of instructor.*

MTH 1312 Real Analysis 2 **4 QH**
Continues MTH 1311. Focuses on calculus, applying the concepts introduced in MTH 1311. *Prereq. MTH 1311.*

MTH 1321 Introduction to Groups and Their Applications **4 QH**
Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.

MTH 1322 Topics in Rings, Fields, and Number Theory **4 QH**
Introduces commutative rings, ideals, integral domains, fields, and Galois theory. Studies extension fields, Gaussian integers, and other topics as time permits. *Prereq. MTH 1321.*

MTH 1330 Number Theory **4 QH**
Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq. MTH 1301 or permission of instructor.*

MTH 1337 Foundations of Mathematics 1 **4 QH**
Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (Core Category V)

MTH 1338 Foundations of Mathematics 2 **4 QH**
Includes set theory, rules for set formation, the axiom of choice and its role in mathematics, transfinite cardinal and ordinal numbers and arithmetic, and axiomatizations of set theory.

MTH 1347 Applied Analysis **4 QH**
Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq. MTH 1246 or permission of instructor.*

MTH 1349 Numerical Analysis 1 **4 QH**
Presents various topics including roots of nonlinear equations, systems of linear equations, interpolation, curve-fitting, and approximation of functions. Emphasizes understanding issues such as how good a numerical solution is or how efficient a method is, rather than theorem-proving or numerical recipes.

MTH 1350 Numerical Analysis 2 **4 QH**
Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349.

MTH 1351 Functions of a Complex Variable 1 **4 QH**
Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq. MTH 1243 or equivalent.*

MTH 1352 Functions of a Complex Variable 2 **4 QH**
Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq. MTH 1351.*

MTH 1360 Seminar in Applied Mathematics **4 QH**
Offers students of mathematics the experience of utilizing their skills to study problems that arise in industry and other "real-world" settings. Provides students with the opportunity to build on exciting industrial experiences that they may have had through co-op or other employment. *Arts and Sciences experiential education requirement.*

MTH 1367 Geometry **4 QH**
Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq. Basic linear algebra or permission of instructor.*

MTH 1370 Recent Ideas in Geometry **4 QH**
Covers a selection of recently created concepts from geometrical fields of study. Topics may include elliptic and hyperbolic non-Euclidean geometries, the classification of isolmeties in the plane, the theory of regular polytopes in higher dimensions, the study of tesselations of the plane and Penrose nonperiodic tilings, the topological study of knots, the classification of surfaces, computational algebraic geometry, and examples of three-manifolds such as the three-sphere and the Poincaré dodecahedral space. *Prereq. MTH 1367 or permission of instructor.*

MTH 1384 Probability for Engineering **4 QH**
Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq. MTH 1223 and MTH 1225 or equivalent.*

MTH 1387 Probability 1 **4 QH**
Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; Law of Large Numbers; and central limit theorem. *Prereq. MTH 1223 or MTH 1244.*

MTH 1388 Probability 2 **4 QH**
Studies selected topics, including introduction to stochastic processes, with emphasis on Markov chains or random walk. *Prereq. MTH 1384 or MTH 1387.*

MTH 1390 Mathematical Statistics **4 QH**
Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. *Prereq. MTH 1384 or MTH 1387.*

MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726, MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741, MTH 1742, Honors Program **4 QH each**
Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1223, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, and MTH 1142, respectively.

MTH 1763 Introduction to Computers (Honors) **4 QH**
Honors equivalent of MTH 1163.

MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805, MTH 1806, MTH 1807, MTH 1808 Directed Study **4 QH**
Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq. Permission of instructor. Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving **4 QH**
Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific realworld models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq. Permission of instructor.*

MTH 1810 Directed Study **1 QH**
Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq. Permission of instructor.*

MTH 1811 Directed Study **2 QH**
Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq. Permission of instructor.*

MTH 1825, MTH 1826, MTH 1827, MTH 1828 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses see page 32. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1521 French Film and Culture
LNF 1550 Introductory Film Analysis
LNF 1551 Film Theory
LNF 1560 Film and Psychoanalysis
LNG 1554 Modern German Film and Literature
LNS 1550 Spanish Civil War in Spanish Film

Linguistics

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses see page 57. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1250 History of the French Language
LNL 1235 Applied Linguistics
LNL 1260 Introduction to Romance Linguistics
LNS 1250 History of the Spanish Language

Literature and Culture (taught in English)

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1510 Modern Philosophical French Literature in Translation
LNF 1512 Introduction to Literature
LNI 1510 The Works of Dante in Translation 1
LNI 1511 The Works of Dante in Translation 2
LNI 1512 Italian Seminar: Pirandello
LNR 1500 Backgrounds in Russian Culture
LNR 1510 The Works of Alexander Pushkin in Translation
LNR 1511 Russian Literature in Translation
LNS 1500 Backgrounds in Hispanic Culture
LNS 1501 Backgrounds of Latin American Culture
LNS 1506 Cervantes and His Times
LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance
LNS 1511 Introduction to Caribbean Literature
LNS 1512 The Don Juan Figure in Literature

Chinese

LNC 1101 Elementary Chinese 1 **4 QH**
Designed to acquaint the student with features of spoken and written Mandarin Chinese. Stresses grammar, oral performance, and simple characters. Students who wish to speak another dialect of Chinese should consult instructor for proper placement.

LNC 1102 Elementary Chinese 2 **4 QH**
Continues LNC 1101. Studies grammar and spoken and written forms of the language. *Prereq. LNC 1101.*

LNC 1103 Intermediate Chinese 1 **4 QH**
Continues LNC 1102. Covers more advanced features of the language as well as continued study of characters. *Prereq. LNC 1102.*

LNC 1104 Intermediate Chinese 2 **4 QH**
Continues LNC 1103. Offers more advanced work in grammar, conversation, and characters. *Prereq. LNC 1103.*

LNC 1801 Directed Study in Chinese **4 QH**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. *Priority given to language majors and to juniors and seniors.*

French

LNF 1101 Elementary French 1 **4 QH**
Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world

of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2 **4 QH**
Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq. LNF 1101.*

LNF 1103 Intermediate French 1 **4 QH**
Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq. LNF 1102 or equivalent.*

LNF 1104 Intermediate French 2 **4 QH**
Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq. LNF 1103.*

LNF 1107 Reading French in the Arts and Sciences **4 QH**
Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. *Not a substitute for LNF 1103 or LNF 1104.*

LNF 1111 Elementary French for Business **4 QH**
Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. *LNF 1102 may be taken as a sequel to LNF 1111.*

LNF 1140 Intensive Intermediate French **8 QH**
Continues study of French to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced French courses. *Prereq. LNF 1102.*

LNF 1201 Intensive Review of French **4 QH**
Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, comprehension, and reading and speaking skills. Required of all French majors, it serves as prerequisite for all other French courses at the 1200 level. Conducted largely in French. Non-majors are invited as well, as this course is an excellent way to review previous French study.

LNF 1202 Advanced French Proficiency 1 **4 QH**
Focuses on the students' particular grammar needs as well as the nuances of the language. Designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French. *Prereq. LNF 1201 or equivalent.*

LNF 1203 Advanced French Proficiency 2 **4 QH**
Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken and written French and the study of idioms. *Prereq. LNF 1202 or equivalent.*

LNF 1204 Advanced French Proficiency 3 **4 QH**
Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq. LNF 1203 or equivalent.*

LNF 1225 Introduction to the French-Speaking World **4 QH**
Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and "pop" aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq. LNF 1104 or equivalent.*

LNF 1231 Masterpieces of French Literature 1 **4 QH**
Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western and Francophone culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (Core Category II) *Prereq. LNF 1201 or equivalent.*

LNF 1232 Masterpieces of French Literature 2 **4 QH**
Continues LNF 1231, which is not a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings may include an "existential" play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (Core Category II) *Prereq. LNF 1201 or equivalent.*

LNF 1250/LIN 1245 History of the French Language **4 QH**
Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq. Reading knowledge of French or permission of instructor.*

LNF 1305 French Literature in the Seventeenth Century **4 QH**
Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the table, the novel, and epistolary writing. Among the authors treated are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sevigne, and Mme. de La Fayette. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1306 French Theatre in the Seventeenth Century **4 QH**
Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Moliere. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1307 French Literature in the Eighteenth Century 1 **4 QH**
Studies the eighteenth century in France, known as the Age of Enlightenment. It was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prévost, and Voltaire. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1308 French Literature in the Eighteenth Century 2 **4 QH**
Focuses on the latter half of the century when we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Lacios, and Beaumarchais. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1309 French Literature of the Nineteenth Century 1 **4 QH**
Treats romanticism as a major cultural phenomenon. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1310 French Literature of the Nineteenth Century 2 **4 QH**
Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the style of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in Les Fleurs du Mal, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1311 French Literature of the Twentieth Century 1 **4 QH**
Offers a study of the major movements in the narrative and dramatic prose writers up to 1950, including Proust, A. France, Colette, Anouilh, and Camus. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1312 French Literature of the Twentieth Century 2 **4 QH**
Continues the study of the 20th century French literature, with an emphasis on the literary journal from Gide to J. Green. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports in French. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1315 French Poetry, Past and Present **4 QH**
Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1405 Topics in French **4 QH**
Provides an in-depth study of specific structural aspects of the French language. Subjects will vary from year to year. *Prereq. LNF 1102 or equivalent.*

LNF 1510 Modern Philosophical French Literature in Translation **4 QH**
Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1512 Introduction to Literature **4 QH**
Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1521 French Film and Culture **4 QH**
Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (Core Category IV)

LNF 1550 Introductory Film Analysis **4 QH**
Provides a basic introduction to film art and compares and contrasts three styles of filmmaking: expressionism, surrealism, and realism as they have been used in Hollywood cinema and the European art cinema. May be taken for French or German credit with permission of the instructor.

LNF 1551 Film Theory **4 QH**
Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (Core Category V)

LNF 1560 Film and Psychoanalysis **4 QH**
Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes, especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

German

LNG 1101 Elementary German 1 **4 QH**
Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 **4 QH**
Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq. LNG 1101 or equivalent.*

LNG 1103 Intermediate German 1 **4 QH**
Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq. LNG 1102 or equivalent.*

LNG 1104 Intermediate German 2 **4 QH**
Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Durrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq. LNG 1103 or equivalent.*

LNG 1107 Reading German **4 QH**
Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German 1 **4 QH**
Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1140 Intensive Intermediate German **8 QH**
Continues study of German to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced German courses. *Prereq. LNG 1102.*

LNG 1201 German Composition and Conversation 1 **4 QH**
Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq. LNG 1104 or equivalent.*

LNG 1202 German Composition and Conversation 2 **4 QH**
Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq. LNG 1201 or equivalent.*

LNG 1231 Masterpieces of German Literature 1 **4 QH**
Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Durrenmatt, and Boll. Works read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is anticipated. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq. LNG 1104 or equivalent.*

LNG 1232 Masterpieces of German Literature 2 **4 QH**
Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq. LNG 1104 or equivalent.*

LNG 1309 German Literature of the Nineteenth Century **4 QH**
Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso,

Klelst, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq. LNG 1232 or equivalent.*

LNG 1311 German Literature of the Twentieth Century **4 QH**
Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq. LNG 1232 or equivalent.*

LNG 1405 Topics in German **4 QH**
Provides an in-depth study of specific structural aspects of the German language. Subjects will vary from year to year. *Prereq. LNG 1102 or equivalent.*

LNG 1554 Modern German Film and Literature **4 QH**
Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the postwar era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Boll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers—Fassbinder, Schlondorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (Core Category IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Italian

LNI 1101 Elementary Italian 1 **4 QH**
Offers the beginner who wants instruction in the essentials of Italian grammar and opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2 **4 QH**
Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq. LNI 1101 or equivalent.*

LNI 1103 Intermediate Italian 1 **4 QH**
Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq. LNI 1102 or equivalent.*

LNI 1104 Intermediate Italian 2 **4 QH**
Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq. LNI 1103 or equivalent.*

LNI 1201 Italian Composition and Conversation 1 **4 QH**
Aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. For students who have mastered the fundamentals of the language. There will be no study of grammar as such. Conducted entirely in Italian. *Prereq. LNI 1104 or equivalent.*

LNI 1202 Italian Composition and Conversation 2 **4 QH**
Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq. LNI 1201 or equivalent.*

LNI 1311 Italian Literature of the Twentieth Century 1 **4 QH**
Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq. LNI 1232 or equivalent.*

LNI 1312 Italian Literature of the Twentieth Century 2 **4 QH**
Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq. LNI 1232 or equivalent.*

LNI 1510 The Works of Dante in Translation 1 **4 QH**
Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Conducted in English. (Core Category III)

LNI 1511 The Works of Dante in Translation 2 **4 QH**
Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello **4 QH**
Examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Linguistics

LNL 1220/LIN 1220 Introduction to Phonetics and Phonology **4 QH**
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LNL 1235/LIN 1235 Applied Linguistics **4 QH**
Explores the solution of language-based re-world problems. Solutions to these problems depend on information not only from linguistics, but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LNL 1240/LIN 1240 Bilingualism **4 QH**
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LNL 1260/LIN 1260 Introduction to Romance Linguistics **4 QH**
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronouns use. Conducted in English. *Prereq. Reading knowledge of one Romance language or permission of instructor.*

Russian

LNR 1101 Elementary Russian 1 **4 QH**
Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 **4 QH**
Continues grammar study; oral and written exercises. *Prereq. LNR 1101.*

LNR 1103 Intermediate Russian 1 **4 QH**
Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq. LNR 1102.*

LNR 1104 Intermediate Russian 2 **4 QH**
Continues LNR 1103. *Prereq. LNR 1103.*

LNR 1201 Russian Composition and Conversation 1 **4 QH**
Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq. LNR 1104 or equivalent.*

LNR 1202 Russian Composition and Conversation 2 **4 QH**
Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq. LNR 1201 or equivalent.*

LNR 1205 Stylistics and Advanced Grammar Analysis 1 **4 QH**
Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq. LNR 1104 or permission of instructor.*

LNR 1309 Russian Short Stories of the Nineteenth Century **4 QH**
Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq. LNR 1104 or equivalent.*

LNR 1315 Russian Expository Prose **4 QH**
Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq. LNR 1104.*

LNR 1316 Russian Folklore **4 QH**
Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq. LNR 1104.*

LNR 1500 Backgrounds in Russian Culture **4 QH**
Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in English Translation **4 QH**
Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences. Conducted in English.

LNR 1511 Russian Literature in English Translation **4 QH**
A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others. Conducted in English.

LNR 1550 History of Soviet Cinema **4 QH**
Surveys the emergence and development of the film industry in the USSR. Examines the political, economic, ideological, and artistic sources of Soviet cinema and their relationship to Russian culture and history. Directors considered include Eisenstein, Vertov, Pudovkin, Dovzhenko, Kozintsev, and Kalatozov. (Core Category IV)

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 **4 QH each**
Directed Study
Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 **4 QH**
Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 **4 QH**
Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq. LNS 1101 or equivalent.*

LNS 1103 Intermediate Spanish 1 **4 QH**
Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq. LNS 1102 or equivalent.*

LNS 1104 Intermediate Spanish 2 **4 QH**
Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq.LNS 1103 or equivalent.*

LNS 1105 Conversational Spanish 1 **4 QH**
Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq. LNS 1104 or equivalent; open to nonmajors only.*

LNS 1106 Conversational Spanish 2 **4 QH**
Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq. LNS 1105 or equivalent; open to nonmajors only.*

LNS 1130 Intensive Spanish **8 QH**
Encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1140 Intensive Intermediate Spanish **8 QH**
Continues study of Spanish to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced Spanish courses. *Prereq. LNS 1102.*

LNS 1201 Spanish Composition and Conversation 1 **4 QH**
Offers practice in writing and speaking Spanish, including written and oral resumes, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 **4 QH**
Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq. LNS 1201 or equivalent.*

LNS 1203 Advanced Spanish Proficiency 1 **4 QH**
Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. Designed for those preparing to enter the teaching profession as well as qualified advanced students. *Prereq. Permission of instructor.*

LNS 1204 Advanced Spanish Proficiency 2 **4 QH**
Continues the aims and goals of LNS 1203. *Prereq. LNS 1203 and permission of instructor.*

LNS 1231 Masterpieces of Spanish Literature 1 **4 QH**
Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid, El libro de buen amor, La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (Core Category II) *Prereq. LNS 1104 or equivalent.*

LNS 1232 Masterpieces of Spanish Literature 2 **4 QH**
Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the generation of '98. Conducted in Spanish. (Core Category II) *Prereq. LNS 1104 or equivalent.*

LNS 1250 History of the Spanish Language **4 QH**
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working know-ledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LNS 1301 Spanish Medieval Literature **4 QH**
Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines non-literary texts such as wills and laws for their historical and literary relevance.

LNS 1306 Spanish Golden Age Theatre **4 QH**
Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1309 Spanish Literature of the Nineteenth Century 1 **4 QH**
Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1310 Spanish Literature of the Nineteenth Century 2 **4 QH**
Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1311 Spanish Literature of the Twentieth Century 1 **4 QH**
Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq. LNS 1232 or equivalent.*

LNS 1312 Spanish Literature of the Twentieth Century 2 **4 QH**
Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayla, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq. LNS 1232 or equivalent.*

LNS 1315 Latin American Literature 1 **4 QH**
Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Díaz, Sor Juana, Jorge Isaacs and José Hernández. *Prereq. LNS 1204 or equivalent.*

LNS 1316 Latin American Literature 2 **4 QH**
Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos and Vargas Llosa. *Prereq. LNS 1204 or equivalent.*

LNS 1400 Spanish Seminar **4 QH**
Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.

LNS 1401 Seminar in Spanish Literature **4 QH**
Focuses on a selected group of Galdos's novels through detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; nonmajors who show exceptional background in Spanish may be admitted. *Prereq. Permission of instructor.*

LNS 1402 Seminar in the Contemporary Spanish Theatre **4 QH**
Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq. LNS 1232 or permission of instructor.*

LNS 1405 Topics in Spanish **4 QH**
Provides an in-depth study of specific structural aspects of the Spanish language. Subjects will vary from year to year. *Prereq. LNS 1102 or equivalent.*

LNS 1500 Backgrounds of Spanish Culture **4 QH**
Examines chronologically the forces which have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (Core Category IV)

LNS 1501 Backgrounds of Latin American Culture **4 QH**
Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (Core Category IV)

LNS 1506 Cervantes and His Times **4 QH**
Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Interludes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (Core Category III)

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance **4 QH**
Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature **4 QH**
Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature **4 QH**
Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (Core Category III)

LNS 1550 Spanish Civil War in Spanish Film **4 QH**
Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936–1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (Core Category III)

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805 Directed Study **4 QH each**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823 Junior/Senior Honors Project **4 QH each**
For details contact the honors office.

Music

MUS 1100 Introduction to Music **4 QH**
Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (Core Category II)

MUS 1101 Music: A Listening Experience **4 QH**
Offers a computer-based "how to listen to classical music" course that assumes no previous musical knowledge. Studies masterworks of Western music but develops listening skills that are globally applicable. Students proceed at their own pace under the guidance and supervision of the instructor. All listening is done at a computer in the Media Center in room 200 Snell Library. (Core Category II)

MUS 1103 Music as a Social Expression **4 QH**
Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (Core Category III)

MUS 1104/AFR 1153 Survey of African-American Musics **4 QH**
Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles.

MUS 1105 Music of the U.S.A. **4 QH**
Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (Core Category V)

MUS 1106 Women, Gender, and Music **4 QH**
Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger. (Core Category VI)

MUS 1107 Principles of Music Literature **4 QH**
Examines the evolution of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. Required of all music majors. *Prereq. Permission of instructor.*

MUS 1109 Introduction to Art, Drama, and Music **4 QH**
Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (Core Category II)

MUS 1110 Music in Popular Culture **4 QH**
Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music **4 QH**
Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112/AFR 1451 Jazz **4 QH**
Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History **4 QH**
Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (Core Category III) *Prereq. MUS 1201.*

MUS 1121 Medieval and Renaissance Music **4 QH**
Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era **4 QH**
Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era **4 QH**
Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven

MUS 1124 Music of the Romantic Era **4 QH**
Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical,

nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (Core Category V)

MUS 1125 Twentieth-Century Music **4 QH**
Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (Core Category V)

MUS 1126 New Directions in Music **4 QH**
Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony **4 QH**
Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers **4 QH**
Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera **4 QH**
Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature **4 QH**
Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry **4 QH**
Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (Core Category III)

MUS 1139 Film Music **4 QH**
Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart **4 QH**
Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1144 Debussy and the Music of Paris **4 QH**
Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.

MUS 1145 Beethoven **4 QH**
Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (Core Category III)

MUS 1146 George Gershwin **4 QH**
Studies the life and works of George Gershwin (1898-1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy 1 **4 QH**
Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2 **4 QH**
Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq. MUS 1161.*

MUS 1163 Sound Health **4 QH**
Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry 1 **4 QH**
Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class.

MUS 1166 The Music Industry 2 **4 QH**
Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, music merchandising,

and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq. MUS 1165.*

MUS 1167 Music Administration **4 QH**
Introduces music management, including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq. MUS 1166 or permission of instructor.*

MUS 1170 Music and Technology **4 QH**
Studies the applications of contemporary technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers. *For non-music majors.*

MUS 1171 Computer Literacy for Musicians **4 QH**
Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum.

MUS 1172 Introduction to Music Recording **4 QH**
Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.

MUS 1173 Music Recording 2 **4 QH**
Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq. MUS 1172.*

MUS 1174 Music Production for Radio **4 QH**
Introduces the core skills required for production of music programs for radio. Instructs students in technical, contextual, and compositional aspects of music production including transmission chains and signal processing, audience targeting using Modal techniques and music demographics analysis, selecting talent, and structuring a program clock. *This course will be open to music industry majors and music industry minors.*

MUS 1175 Music and Technology 2 **4 QH**
Continues MUS 1170. Presents advanced topics related to music composition with computers. Emphasizes the completion of original music works that employ various methods of sound synthesis, such as additive synthesis, frequency modulation, subtractive synthesis, physical modeling, resynthesis, and MIDI. Students will use both hardware and software production tools for the completion of these works. *Prereq. MUS 1170 or MUS 1171 or permission of instructor.*

MUS 1180 Introduction to World Music **4 QH**
Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181/AFR 1156 Music of Africa **4 QH**
Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African musics, instruments, and performance traditions.

MUS 1182 Music of the Middle East **4 QH**
Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia **4 QH**
Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills. (Core Category IV)

MUS 1184 Musics of South America, Latin America, and the Caribbean **4 QH**
Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertories, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism. (Core Category IV)

MUS 1185 The Music of the Jewish People **4 QH**
Investigates the role that music has played in Jewish life from ancient to modern times. Topics to be studied include: music in the time of *The Bible*, Rabbinic attitudes toward music, music and mysticism, the development of the modes for prayer and scriptural cantillation, church and synagogue music compared, music of the holidays and the life cycle, folk and popular music in the diaspora, the development of art music in the modern era, and music in modern Israel. (Core Category IV) *Prior knowledge of music is not required.*

MUS 1200 Fundamentals of Music **4 QH**
Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms. Students may elect to take MUS 1210 for one extra credit.

MUS 1201 Music Theory 1 **4 QH**
Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. Students may elect to take MUS 1210 for one extra credit.

MUS 1202 Music Theory 2 **4 QH**
Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Students may elect to take MUS 1210 for one extra credit. *Prereq. MUS 1201.*

MUS 1203 Music Theory 3 **4 QH**
Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. Students may elect to take MUS 1210 for one extra credit. *Prereq. MUS 1202.*

MUS 1204 Music Theory 4 **4 QH**
Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. Students may elect to take MUS 1210 for one extra credit. *Prereq. MUS 1203.*

MUS 1209 Functional Piano **4 QH**
Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq. MUS 1202.*

MUS 1210 Music Theory Lab **1 QH**
Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing **4 QH**
Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq. MUS 1201 or equivalent.*

MUS 1230 Chorus **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1231 Band **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1232 Chamber Ensembles and Orchestra **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1233 Early Music Players **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1234/AFR 1234 Jazz Ensemble **1 QH**
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American musics. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

MUS 1241 Piano Class 1 **4 QH**
Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2 **4 QH**
Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq. MUS 1241.*

MUS 1244 Voice Class 1 **4 QH**
Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq. Permission of instructor.*

MUS 1247 Guitar Class 1 **4 QH**
Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting **4 QH**
Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq. Ability to read music and to sing or play an instrument.*

MUS 1261 Music Lessons **1 QH**
Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee. *Prereq. Music majors only and permission of instructor.*

MUS 1265/AFR 1233 Jazz Improvisation 1 **4 QH**
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1 **4 QH**
Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq. MUS 1204.*

MUS 1302 Form and Analysis 2 **4 QH**
Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq. MUS 1301.*

MUS 1360 Artist Management **4 QH**
Provides an in-depth investigation of the field of musical artist management. Explores the artist-manager relationship, the management contract, artist evaluation, image formulation, the artist's development team, achieving a recording contract, merchandising, endorsements, sponsorships, touring, and financial management. *Prereq. MUS 1166 or permission of instructor.*

MUS 1362 Music Merchandising **4 QH**
Provides a thorough examination of business organization, marketing, distribution, and sales techniques in the diverse field of music merchandising. Investigates market sectors such as musical instruments; professional, semiprofessional, and home audio equipment; the recording industry; and print music. Presents guest speakers from various sectors of the music industry. *Prereq. MUS 1166 or permission of instructor.*

MUS 1365 Seminar in the Music Industry **4 QH**
A capstone course for music industry students. Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to reflect upon, distill, and apply knowledge accumulated in prior courses and previous experiential learning. This reflection and application will occur through substantial writing assignments and classroom discussion. *Prereq. MUS 1166 and senior standing.*

MUS 1366 Copyright Law for Musicians **4 QH**
Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. *Prereq. MUS 1166 or permission of instructor.*

MUS 1367 Computer Applications in Music Business ***4 QH***
Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq. MUS 1166.*

MUS 1421 Historical Traditions 1: American Music **4 QH**
Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical musics. *Prereq. MUS 1107.*

MUS 1422 Historical Traditions 2 **4 QH**
Provides an overview of early Western music, from the middle ages through the seventeenth century in cultural and stylistic contexts. Concentrates on classical music, but will also deal with music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1423 Historical Traditions 3 **4 QH**
Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1424 Historical Traditions 4 **4 QH**
Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular musics as well. *Prereq. MUS 1421.*

MUS 1425 Historical Traditions 5 **4 QH**
Examines the historical musical traditions of selected music-cultures of Africa, Asia, Oceania, and indigenous cultures of the Americas. Provides an in-depth study of the evolution of the selected music-cultures focusing on the following considerations: ethnomusicological historical approaches to the study of music-cultures including music and the belief system, aesthetics, context for music, repertoires, organization of musical sound, instruments and performance techniques, and learning and transmission of musical knowledge (performance and non-performance). Explores why music is different among the world's peoples; what music of the past sounded like, its impact on how music sounds today; what happens to music over time and space; and why music should be preserved and by whom. *Prereq. MUS 1421.*

MUS 1461 Applied Music Lessons **3 QH**
Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq. Permission of instructor and department chair.*

MUS 1700 Introduction to Music (Honors) **4 QH**
Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) **4 QH**
Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study **4 QH each**
Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813 Junior/Senior Honors Project **4 QH each**
For details contact the honors office.

Courses at the New England Conservatory
Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion

PHL 1100 Introduction to Philosophy **4 QH**
Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (Core Category II)

PHL 1110 Introduction to Religion **4 QH**
Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a radically different way, and how that leads to distinctive ways of life. (Core Category II)

PHL 1130 Ethics: East and West **4 QH**
Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcuq Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (Core Category V)

PHL 1135 Philosophical Problems of Law and Justice **4 QH**
Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (Core Category VI)

PHL 1140 Social and Political Philosophy **4 QH**
Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (Core Category V) *Prereq. 4 QH philosophy.*

PHL 1160 Philosophical Problems of Economic Justice **4 QH**
Focuses on the questions: What is economic justice? And, What features must a society have in order to be economically just? Readings include classical and contemporary works by philosophers and other thinkers. Analyzes and evaluates economic systems such as capitalism, socialism, and the welfare state.

PHL 1165 Moral Problems in Medicine **4 QH**
Introduces students to ethical theories, moral principles, and principles of distributive justice. Uses these theories and principles to analyze the moral problems that arise in the medical context. Topics considered are: euthanasia, medical paternalism, informed consent, patient confidentiality, the duty to warn, the right to die and advanced directives, the ethics of medical research, abortion, and human genetics. Also examines the right to health care, distribution of scarce medical resources, and the ethical implications of health maintenance organizations.

PHL 1170 Business Ethics **4 QH**
Examines ethical principles and considerations involved in making moral business decisions. Studies the foundation of basic ethical viewpoints and analyzes specific characteristics of business life through case studies and examples. Includes issues such as corporate responsibility, employee rights, conflict of interest and roles, advertising and information disclosure, environmental issues, and self- and governmental regulation.

PHL 1180 Environmental Ethics **4 QH**
Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (Core Category VI)

PHL 1200 Introduction to Logic 1* **4 QH**
Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (Core Category II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2* **4 QH**
Continues the study of the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (Core Category II)

PHL 1215/LIN 1215 Symbolic Logic* **4 QH**
Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (Core Category II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy **4 QH**
Examines the philosophy of classical Greece. Considers philosophers with distinctive views of the nature of the material world and of the person, so the course covers both metaphysical and moral writings. Texts are primarily from Socrates, Plato, and Aristotle. Also gives some consideration to early Greek philosophers, to the Sophists, and to later developments. (Core Category III)

PHL 1230 Modern Philosophy **4 QH**
Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (Core Category III) *Prereq. 8 QH philosophy.*

PHL 1243 Existentialism **4 QH**
Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq. 4 QH philosophy.*

*Students should take either PHL 1200 and PHL 1203 *or* PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1245 Analytic Philosophy **4 QH**
Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq. 8 QH philosophy.*

PHL 1250 Chinese Religion **4 QH**
Offers a study of Chinese philosophy in the ancient period (until 221 B.C.E.). Emphasizes Confucianism, Taoism, and the I Ching. Covers the Logicians, the Mohists, and the Legalists.

PHL 1265 Latin American Religions **4 QH**
Explores the major religious traditions of Latin America—indigenous, Christian, and African—and how they have influenced each other, resulting in the syncretisms and religious cultures of our own day. Uses historical texts, narrative, art, interpretive essays, and music to look at the dynamics of that interplay, exploring in particular the factors that have shaped what was introduced, accepted, rejected, and retained. (Core Category III)

PHL 1275 Eastern Religions **4 QH**
Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Hahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (Core Category IV)

PHL 1280 Islam **4 QH**
Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (Core Category IV)

PHL 1285 Introduction to Jewish Religion and Culture **4 QH**
Explores the basic features of Judaism in the ancient, Rabbinic and Modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.

PHL 1290 Cults and Sects **4 QH**
Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions. (Core Category V)

*Students should take either PHL 1200 and PHL 1203 *or* PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1293 Eastern and Nontraditional Philosophy **4 QH**
Offers a multicultural look, using primary sources, at the diverse perspectives available to address philosophical issues. Perspectives include African, Asian, Latin American, feminist, womanist, Amerindian, and African-American views. Includes such topics as self-identity, reality, truth, knowledge, ethics, social and political arrangements, and perceptions of divinity.

PHL 1315 Understanding the Bible **4 QH**
Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (Core Category III)

PHL 1316 Interpreting the Bible **4 QH**
Offers students the opportunity to understand the Bible as a document that is continually interpreted by believing communities in their own social and religious contexts. Studies various interpretations of such passages as the creation story, resurrection accounts, themes in Revelation, and the Exodus event. *Prereq. PHL 1315.*

PHL 1320 The Meaning of Death **4 QH**
Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (Core Category V)

PHL 1335 Moral Philosophy **4 QH**
Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq. 4 QH philosophy or religion or permission of instructor.* (Core Category V)

PHL 1340 Aesthetics **4 QH**
Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq. 4 QH philosophy.*

PHL 1345 Philosophy of Religion **4 QH**
Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq. 4 QH philosophy.*

PHL 1350 Philosophy of Human Nature **4 QH**
Considers various attributes of human beings such as intelligence, sexuality, and language in the context of biological, psychological, linguistic, and philosophical views of human nature. Topics and disciplines will change from year to year. (Core Category V)

PHL 1360 Philosophy and Literature **4 QH**
Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors such as Voltaire, Dostoevski, and Sartre; popular contemporary authors such as Vonnegut, Barth, and Pynchon; and readings from more straightforward philosophical sources. Examines the meaning of life, the human condition, depersonal-ization, alienation, human freedom, questions of value, responsibility, rationality, and personal identity. Explores religious, nihilistic, existential, and other viewpoints.

PHL 1370 The Meaning of Life **4 QH**
Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1400 Theory of Knowledge **4 QH**
Focuses on questions about the nature and justification of claims to knowledge. Is there genuine knowledge? How do we tell when a belief or theory is sufficiently justified to count as knowledge? Discusses theories such as various forms of rationalism, empiricism, and skepticism. Requires careful reading of works by such influential thinkers as René Descartes, Bertrand Russell, A.J. Ayer, and T.S. Kuhn. *Prereq. 16 QH philosophy.*

PHL 1405 Metaphysics **4 QH**
Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq. 8 QH philosophy.*

PHL 1410 Philosophy of Science **4 QH**
Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq. 4 QH philosophy.*

PHL 1415 Advanced Logic **4 QH**
Studies the major results in the meta-theory of first order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq. PHL 1215.*

PHL 1435 Philosophy of Mind **4 QH**
Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq. 4 QH philosophy.*

PHL 1440/LIN 1440 Philosophy of Language **4 QH**
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor. *Prereq. Permission of instructor.*

PHL 1550, PHL 1551, PHL 1552, PHL 1553 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

PHL 1700 Introduction to Philosophy (Honors) **4 QH**
Honors equivalent of PHL 1100.

PHL 1720 The Meaning of Death **4 QH**
Honors equivalent of PHL 1320.

PHL 1740 Social and Political Philosophy (Honors) **4 QH**
Honors equivalent of PHL 1140.

PHL 1800 Directed Study **4 QH**
Those interested in the directed study program should meet with the department chair. *Prereq. permission of instructor.*

PHL 1801 Research Internship **4 QH**
Seeks to familiarize students with at least one of the three stages of an advanced research project: 1) securing research funds, 2) substantive research and research techniques, and 3) publication and presentation of research results. Students may opt to take this practicum in conjunction with a writing project of their own. In addition to helping students develop additional knowledge of the research resources that are available, this course is intended to develop their critical skills. *Prereq. Permission of supervising instructor and 24 QH of PHL courses.*

PHL 1802 Teaching Internship **4 QH**
Centers around two issues central to the pedagogical enterprise; namely, course design and implementation. Involves discussions with the supervisor, observation of teaching techniques, test development, discussion leading, and lecture presentation. Students will work with the instructor in one course, assist in syllabus development, observe and lead several discussions, and present a lecture or lectures on one topic to be determined during the syllabus development. *Prereq. Permission of supervising instructor and 24 QH of PHL courses.*

PHL 1888 Great Philosophers Seminar **4 QH**
Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq. 12 QH of philosophy courses.*

PHIL 1890 Seminar in Religion **4 QH**
Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq. 12 QH of philosophy and religion courses.*

PHL 1891 Major Figures in Religious Studies **4 QH**
Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq. 12 QH of religious studies.*

PHL 3265 Issues in Medical Ethics **4 QH**
Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq. Permission of instructor.*

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy 1 **4 QH**
Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (Core Category II)

PHY 1121 Introduction to Science 1 **4 QH**
Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (Core Category II)

PHY 1131 Energy and the Environment **4 QH**
Presents concepts of physics applied to current problems of the physical environment. Topics include sources of energy (fossil fuels, nuclear, and solar); energy storage and conservation; transportation; and pollution of the atmosphere. No previous knowledge of physics is assumed. (Core Category VI)

Introductory Physics Courses

PHY 1191 Physics for BSET 1 **4 QH**
Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq. MTH 1191, which may be taken concurrently; BSET majors only.*

PHY 1192 Physics for BSET 2 **4 QH**
Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq. PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.*

PHY 1193 Physics for BSET 3 **4 QH**
Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq. PHY 1192; BSET majors only.*

PHY 1201 Physics for the Life Sciences 1 **4 QH**
Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (Core Category II)

PHY 1202 Physics for the Life Sciences 2 **4 QH**
Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (Core Category II) *Prereq. PHY 1201.*

PHY 1203 Physics for the Life Sciences 3 **4 QH**
Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq. PHY 1202.*

PHY 1221 Physics for Science and Engineering Students 1 **4 QH**
The first quarter of a four quarter sequence intended primarily for science and engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions, and rotations. *Prereq. MTH 1123 or equivalent, which may be taken concurrently.*

PHY 1222 Physics for Science and Engineering Students 2 **4 QH**
Continues PHY 1221. Focuses on rotation equilibrium, angular momentum, harmonic motion, fluid mechanics, wave motion, sound, and optics. *Prereq. PHY 1221 and MTH 1124 or equivalent, which may be taken concurrently.*

PHY 1223 Physics for Science and Engineering Students 3 **4 QH**
Focuses on electricity, electric fields, electric potential, Ohm's law, simple circuits, magnetic fields, Faraday's law and induction, and Maxwell's equations. *Prereq. PHY 1222 and MTH 1125 or equivalent, which may be taken concurrently.*

PHY 1224 Physics for Science and Engineering Students 4 **4 QH**
Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schroedinger equation, wave functions, the hydrogen atom, solids, nuclear and atomic physics). *Prereq. PHY 1221, PHY 1222, and PHY 1223 or equivalent.*

PHY 1252 Physics Review **1 QH**
Offers a calculus-based review for students who have had previous college physics courses not equivalent to the engineering sequence of PHY 1221 through PHY 1224. Covers fundamentals of mechanics, electricity, and magnetism. *Prereq. One year of college physics and knowledge of elementary calculus.*

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1 **1 QH**
Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq. PHY 1191 concurrently; BSET majors only.*

PHY 1197 Physics BSET Laboratory 2 **1 QH**
Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq. PHY 1196; PHY 1192 concurrently; BSET majors only.*

PHY 1198 Physics BSET Laboratory 3 **1 QH**
Covers experiments from PHY 1193. Lab fee. *Prereq. PHY 1193 concurrently; BSET majors only.*

PHY 1501 Physics Laboratory for the Life Sciences 1 **1 QH**
Accompanies PHY 1201. *Prereq. PHY 1201 concurrently.*

PHY 1502 Physics Laboratory for the Life Sciences 2 **1 QH**
Accompanies PHY 1202. *Prereq. PHY 1501; PHY 1202 or PHY 1203 concurrently.*

PHY 1521 Physics Laboratory for Science and Engineering Students 1 **1 QH**
The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. *PHY 1221 concurrently.*

PHY 1522 Physics Laboratory for Science and Engineering Students 2 **1 QH**
Continues PHY 1521. *Prereq. PHY 1521; PHY 1222 concurrently.*

PHY 1533 Physics Laboratory for Science Majors 3 **1 QH**
Focuses on lab experiments related to topics covered in PHY 1233. *Prereq. PHY 1522; PHY 1223 concurrently.*

Advanced Physics and Astronomy Courses

PHY 1300 Physics with Computers **4 QH**
Introduces using computer software to solve scientific problems. Uses spreadsheet programs and MATLAB to discuss examples such as motion damped by friction, resonance phenomena, simulation of exponential decay processes, period doubling, and chaos. *Prereq. PHY 1223 or equivalent, or permission of instructor.*

PHY 1302 Electric and Magnetic Fields **4 QH**
Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form.

PHY 1303 Modern Physics **4 QH**
Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. Introduces the special theory of relativity. *Prereq. PHY 1223 or equivalent.*

PHY 1304 Mathematical Physics **4 QH**
Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq. MTH 1244 and PHY 1233; MTH 1246 concurrently.*

PHY 1305 Thermodynamics and Kinetic Theory **4 QH**
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq. PHY 1224 or PHY 1233, and MTH 1244.*

PHY 1401 Classical Mechanics **4 QH**
Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq. PHY 1301 and MTH 1245.*

PHY 1402 Electricity and Magnetism 1 **4 QH**
Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq. PHY 1302 and PHY 1304 or equivalent.*

PHY 1403 Electricity and Magnetism 2 **4 QH**
Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq. PHY 1402 or equivalent.*

PHY 1404 Wave Motion and Optics **4 QH**
Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq. PHY 1302.*

PHY 1411 Introduction to Astrophysics and Cosmology **4 QH**
Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectroscopes, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq. Three quarters of elementary physics.*

PHY 1413 Introduction to Nuclear Physics **4 QH**
Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq. PHY 1303.*

PHY 1414 Introduction to Solid State Physics **4 QH**
Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq. CHM 1383 or PHY 1303; and PHY 1305 or equivalent.*

PHY 1415 Quantum Mechanics 1 **4 QH**
Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq. CHM 1383 or PHY 1303; and PHY 1304 or equivalent.*

PHY 1416 Quantum Mechanics 2 **4 QH**
Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq. PHY 1415.*

PHY 1551 Electronics for Scientists 1 **4 QH**
With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2 **4 QH**
Continues PHY 1551. *Prereq. PHY 1551.*

PHY 1555 Wave Laboratory **4 QH**
Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and microwaves to illustrate these problems. *Prereq. PHY 1224 or PHY 1302.*

PHY 1557 Advanced Physics Laboratory **4 QH**
Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq. PHY 1551 and PHY 1552.*

PHY 1561 Project Laboratory **4 QH**
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq. Permission of instructor.*

PHY 1711 Introduction to Astronomy 1 (Honors) **4 QH**
Honors equivalent of PHY 1111.

PHY 1721 Physics 1 **4 QH**
Honors equivalent of PHY 1221.

PHY 1722 Physics 2 **4 QH**
Honors equivalent of PHY 1222.

PHY 1723 Physics 3 **4 QH**
Honors equivalent of PHY 1223.

PHY 1724 Physics 4 **4 QH**
Honors equivalent of PHY 1224.

PHY 1885, PHY 1886, PHY 1887, PHY 1888 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Political Science

POL 1110 Introduction to Politics **4 QH**
Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (Core Category II)

POL 1111 Introduction to American Government **4 QH**
Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policymaking. (Core Category II)

POL 1112/IAF 1112 Introduction to International Relations **4 QH**
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (Core Category II)

POL 1113/IAF 1113 Introduction to Foreign Governments **4 QH**
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1114 The United States Constitution **4 QH**
Introduces the U.S. Constitution by exploring its theory, its origin, and the institutions by which it bestows and restrains power. Surveys the constitutional liberties guaranteed. Examines what this fundamental supreme United States law means today, two centuries after its ratification. Other topics include congressional areas of policy-making responsibility, presidential power, the role of the judiciary in the American system of government, and the reconciliation of majority rule with minority rights.

POL 1260 Public Policy Analysis **4 QH**
Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policymaking process. Introduces such concepts as problem definition, agenda-development, policy formation, implementation, and program evaluation. Examines basic policy analysis methods. (Core Category VI)

POL 1261 Public Administration **4 QH**
Provides a broad overview of the administrative aspects of public policies and programs. Topics include public management, organizations, budgeting, personnel administration, and program evaluation.

POL 1262 Bureaucracy and Government Organizations **4 QH**
Examines the general principles underlying the structures, processes, and operation of public organizations. Looks at the role of bureaucracies within the larger political system, as well as how public agencies develop and change over time.

POL 1266 Public Personnel Administration **4 QH**
Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining.

POL 1267 Politics of Budgeting and Taxation **4 QH**
Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context.

POL 1301 Research Methods 1 **4 QH**
Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq. Prior completion of college mathematics requirement.*

POL 1302 Research Methods 2 **4 QH**
Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of a programming language to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq. POL 1301 and prior completion of college mathematics requirement.*

POL 1303 Political Behavior **4 QH**
Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics **4 QH**
Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe **4 QH**
Offers a comparative survey of the societies, economies, and political systems in the democracies of Western Europe. Examines governing structures and major political developments within the major European states, as well as major policy issues (e.g., nationalism, federalism, environmentalism) and issues of European integration within the European Union. (Core Category III)

POL 1308/AFR 1271 The Politics of Poverty **4 QH**
Explores how and why there is poverty, how it affects people's lives, and how it can be eliminated. Examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 International Political Economy **4 QH**
Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq. A course in either economics or international politics is recommended, but not required.* (Core Category V)

POL 1310 American Ideology **4 QH**
Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (Core Category V) *Prereq. Middler standing or above, or permission of instructor.*

POL 1312 Politics and the Mass Media **4 QH**
Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organizations **4 QH**
Focuses on the development of roles played by international governmental organizations, examining their dual roles as collections of sovereign states and as political actors in their own right. Analyzes the structure and functions of such global organizations as the United Nations as well as regional organizations like the European Union and Organization of American States.

POL 1314 Interest Groups and Public Policy **4 QH**
Surveys the roles of organized interests in American public policy-making. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1316 Contemporary Revolutionary Politics **4 QH**
Examines revolution as a political option and revolutionary movements throughout the world today. Examples will be taken from Marxism-Leninism (e.g., Bolshevik Russia, China, Cuba), revolutionary Islam (e.g., Iran, Algeria), and the anti-Communist forces in the former Soviet Union and eastern Europe. Examines the perennial conflict between revolution as an ideal and regime consolidation as a necessity. (Core Category VI)

POL 1317 Law and Society **4 QH**
Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.

POL 1318 State and Local Government **4 QH**
Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. *Prereq. POL 1111.*

POL 1319 Government and Politics of Massachusetts **4 QH**
Emphasizes the political and administrative aspects of government in Massachusetts. Considers the structure and functions of state government as well as major policy problems confronted by public officials. Analyzes the relationship between state and local governments in Massachusetts. *Prereq. POL 1111.*

POL 1320 Parties and Elections **4 QH**
Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policymaking, and national and state historical trends.

POL 1322 World Politics **4 QH**
Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States-Soviet and Arab-Israeli viewpoints.

POL 1324 Urban Politics **4 QH**
Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective.

POL 1327 Gender Politics **4 QH**
Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in "new politics." Also covers political action to promote women's issues and modern feminism. (Core Category VI)

POL 1329 American Social Welfare Policy **4 QH**
Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system.

POL 1331 Science, Technology, and Public Policy **4 QH**
Considers the effects of science and technology on politics and policymaking in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to "solve" than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (Core Category VI)

POL 1332 Government and Politics of Japan **4 QH**
Focuses on the development of Japan's political system since World War II. Examines Japan's political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan's foreign policy; and business practices and organization. Raises issues concerning Japan's extraordinary economic success and the limitations of Japan as a model for other countries. (Core Category IV) *Not open to freshmen.*

POL 1334 Environmental Policy & Politics **4 QH**
Examines the policy-making processes, historical and socio-economic factors, political forces, governmental institutions, and global trends that shape environmental policy at national and sub-national levels in the United States. Gives attention to a wide range of environmental policy areas, with comparisons made between the United States and other nations.

POL 1335 The American Presidency **4 QH**
Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.

POL 1336 American Constitutional Law **4 QH**
Employs excerpts of United States Supreme Court decisions and other reading materials to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq. POL 1111 and junior or senior standing.*

POL 1337 United States Foreign Policy **4 QH**
Examines formulation and conduct of foreign policy and the United States since World War II.

POL 1338 Religion and Politics **4 QH**
Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in America. (Core Category V)

POL 1339 Current Political Issues **4 QH**
Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.

POL 1340 Crisis and Change in Central/Eastern Europe **4 QH**
Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia and examines political, economic, social, and international problems of post-communist development. (Core Category IV)

POL 1342/AFR 1342 Government and Politics of Africa **4 QH**
Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. (Core Category VI)

POL 1343 Politics and Violence in Northern Ireland **4 QH**
Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international

dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and the peace process. Draws comparative parallels, including possible lessons for the United States. (Core Category IV)

POL 1345 Government and Politics in the Middle East **4 QH**
Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (Core Category VI)

POL 1346 Gender, Family, and Politics in the Middle East **4 QH**
Surveys the roles that gender and family play in political, economic, and social issues of the Middle East. Focuses on several political systems to provide a view of the diversity and similarity between various governments and societies. Topics include women in development; the connection between family and political power; women and Islam; legal status of women; and women in liberation movements. *Prereq. POL 1345 or INT 1150/HST 1490 or permission of instructor.* (Core Category IV)

POL 1347 Russian Politics After Communism **4 QH**
Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of inter-ethnic strife. (Core Category IV)

POL 1348 Russian Foreign Policy **4 QH**
Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.

POL 1350 American Legislative Process **4 QH**
Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.

POL 1351 Techniques and Practices of Public Management **4 QH**
Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.

POL 1353 Law and Personal Morality **4 QH**
Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.

POL 1355 Ethnic Conflict **4 QH**
Analyzes the causes and consequences of ethnic political violence in the contemporary world. Examines selected cases based on their importance and their usefulness for understanding ethnic conflict (such as Bosnia, Canada, Northern Ireland, and states of the former Soviet Union). Considers various policies for preventing and resolving ethnic political violence. (Core Category IV)

POL 1362 Civil Liberties **4 QH**
Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.

POL 1364 Business and Government Relations **4 QH**
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.

POL 1368 Government and Politics of Latin America **4 QH**
Examines the governmental systems, political parties, socio-economic problems, and foreign policies of Latin American states. Focuses on political change. (Core Category IV)

POL 1369 Political Violence **4 QH**
Analyzes political violence in its various contemporary forms (for example, war, revolution, genocide, political terrorism, and military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence. (Core Category VI)

POL 1371 Government and Politics of China **4 QH**
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (Core Category IV)

POL 1373 Pre-Modern Political Thought **4 QH**
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance. (Core Category V) *Prereq. Middler standing or above.*

POL 1374 Modern Political Thought **4 QH**
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (Core Category V) *Prereq. Middler standing or above.*

POL 1378 Contemporary Political Thought **4 QH**
Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, and women's liberation. Also studies the decline of ideology and behavioralism.

POL 1379 Marx and Marxism **4 QH**
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses

class struggle, social revolution, and communism. (Core Category V)

POL 1382 Intergovernmental Relations **4 QH**
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.

POL 1384 Arab-Israeli Conflict **4 QH**
Analyzes the effects of the Arab-Israeli confrontation on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (Core Category VI)

POL 1386 International Law **4 QH**
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq. POL 1112.*

POL 1388 Political Polling and Survey Research **4 QH**
Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq. POL 1301.*

POL 1389 American National Security Policy **4 QH**
Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1410 Seminar in American Government **4 QH**
Offers an in-depth study of selected topics in American government. *Prereq. Senior political science major and permission of instructor.*

POL 1411 Seminar in International Relations **4 QH**
Offers an in-depth study of selected topics in international relations. *Prereq. Senior political science major and permission of instructor.*

POL 1413 Senior Seminar in Political Science **4 QH**
Offers an in-depth study of selected topics in political science. *Prereq. Senior political science major.*

POL 1415 Seminar in Public Law and Social Issues **4 QH**
Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than merely personal or political, answers to contentious legal questions. *Prereq. Junior or senior standing.*

POL 1710 Introduction to Politics (Honors) **4 QH**
Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) **4 QH**
Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) **4 QH**
Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 **4 QH each**
Directed Study
Offers independent work on chosen topics under the direction of members of the department. *Prereq. Junior or senior standing and permission of instructor.*

POL 1803 Internship in Politics **4 QH**
With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *Prereq. Junior or senior standing normally required.*

POL 1804 Vote Smart Practicum **4 QH**
Offers supervised hands-on experience with a nationally recognized non-partisan voters' information resource center. Students are trained on the computer in the use of various databases, engage in assigned research tasks, and assist voters and journalists seeking information on candidates for federal and state office.

POL 1805 Internship in American Government and Politics **4 QH**
Students engage in an internship in the Federal government with department approval, under the supervision of a faculty member. *Prereq. Junior or senior standing usually required.*

POL 1815 Internship in State Government **6 QH**
Combines state government work experience with academic studies. Students work 15 hours per week in a state government office and attend classes every other week in which work experience and related readings are discussed. *Prereq. POL 1111 or POL 1318.*

Psychology

PSY 1110 Perspectives in Psychology 1 **4 QH**
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. *Students who earn credit for PSY 1111 will not earn credit for PSY 1110.* (Core Category II)

PSY 1111 Foundations of Psychology 1 **4 QH**
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 **4 QH**
Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq. PSY 1110 or PSY 1111.*

PSY 1113 Perspectives in Psychology 2 **4 QH**
Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (Core Category II) *Prereq. PSY 1110 or PSY 1111.*

PSY 1210 Research Methods in Psychology **4 QH**
Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq. PSY 1112 or PSY 1113.*

PSY 1211 Statistics in Behavioral Science 1 **4 QH**
Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq. MTH 1101 or MTH 1107, and PSY 1112.*

PSY 1212 Statistics in Behavioral Science 2 **4 QH**
Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq. PSY 1211.*

PSY 1215 Sexual Behavior **4 QH**
Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness **4 QH**
Introduces the varied scientific approaches to the study of consciousness and the diverse theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming; hypnosis, meditative states, pain perceptions, and anomalistic psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems. *Prereq. PSY 1112 or PSY 1113.*

PSY 1218 Psychology of Women **4 QH**
Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness **4 QH**
Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation 1 **4 QH**
Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq. PSY 1112 or PSY 1113.*

PSY 1241 Developmental Psychology **4 QH**
Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq. PSY 1112 or PSY 1113.*

PSY 1242 Adult Development and Aging **4 QH**
Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq. PSY 1112 or PSY 1113.*

PSY 1243 Infant Development **4 QH**
Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq. PSY 1241 or ED 1102.*

PSY 1244 Childhood Mental Illness and Mental Retardation **4 QH**
Focuses on mental illnesses that are first diagnosed in childhood such as autism, phobias, conduct disorders, and attention-deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping. Covers etiological factors in mental retardation (e.g., maternal disease, lead poisoning, chromosome abnormalities). Describes personality characteristics of individuals with mental retardation as well as the effects of institutionalization, mainstreaming, and psychological interventions. *Prereq. PSY 1112.*

PSY 1251 Food, Behavior, and Eating Disorders **4 QH**
Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language **4 QH**
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

PSY 1263 Nonverbal Communication **4 QH**
Examines the messages we send by posture, facial expression, voice quality, gestures, touch, gaze, and interpersonal distance. Examines origins and consequences of these behaviors as well as differences related to culture, personality, power, gender, and age. *Prereq. PSY 1112 or PSY 1113.*

PSY 1271 Social Psychology **4 QH**
Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change, measurement, conformity, impression formation, and group processes (social facilitation, deindividuation, for example). *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1272 Personality 1 **4 QH**
Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq. PSY 1112 or PSY 1113.*

PSY 1273 Personality 2 **4 QH**
Continues PSY 1272. *Prereq. PSY 1272.*

PSY 1274 Psychology and the Law **4 QH**
Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1280 Black Psychological Identity **4 QH**
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology. This course is the same as AFR 1280.

PSY 1351 Psychobiology **4 QH**
Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1353 Animal Behavior **4 QH**
Surveys animal behavior in a wide range of species (reptiles, birds, fish, and mammals, including humans) to find similarities and differences in the behavioral processes and physiological mechanisms by which individual organisms and species adapt to their environments. The first section focuses on adaptive specializations exhibited by animals in learning about their environments during early development and as adults. The second section examines problems of social organizations at the individual level: how animals communicate with each other and transmit "cultural" skills; mechanisms underlying cohesion and dispersal (for example, reproduction and aggression); and the adaptive advantages of being social or asocial. The final section provides students with an unusual opportunity to apply concepts and experimental methods they have learned by actually doing a short field study of animal behavior at the Boston Zoological Park. *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1362/LIN 1362 Language Acquisition **4 QH**
Examines how language develops in children. *Prereq. LIN 1118, PSY 1262, or permission of instructor.*

PSY 1364 Cognition **4 QH**
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

PSY 1365 Language and the Brain **4 QH**
Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq. PSY 1262 or permission of instructor.*

PSY 1371 Industrial/Organizational Psychology **4 QH**
Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq. PSY 1271 and PSY 1211.*

PSY 1373 Abnormal Psychology 1 **4 QH**
Surveys the abnormal personality, including systems of diagnoses, defense mechanisms, and criteria of psychopathology. Examines the symptomatology, etiology, and dynamics of anxiety disorders (phobia, obsessions, compulsions, etc.), dissociative disorders (amnesia, multiple personality, etc.), and somatoform disorders. Examines case histories in detail. *Prereq. PSY 1112 or PSY 1113.*

PSY 1374 Abnormal Psychology 2 **4 QH**
Surveys psychological and somatic therapies. Examines the symptomatology, etiology, dynamics, and therapy of schizophrenia, paranoid disorders, mania, depression, and organic disorders. *Prereq. PSY 1373.*

PSY 1375 Clinical Case Study Development **4 QH**
Students reflect upon the clinical case study notes and personal journal entries made during the preceding clinical co-op experience. Students are expected to identify and research the psychological,

neuropsychological, systemic, and behavioral aspects of disorders (e.g., mental retardation, eating disorders, schizophrenia) that they encountered. Evaluates proficiency in applying theoretical perspectives to research through written and oral reports.

PSY 1381 Sensation **4 QH**
Provides an introduction to the study of our senses, with emphasis on hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq. PSY 1112 or PSY 1113; PSY 1351 is highly recommended.*

PSY 1382 Perception **4 QH**
Offers a study of our awareness of the world around us, exemplified primarily by visual perception. Covers light, visual sensory mechanisms, color vision, illusions, consciousness, and dreams. *Prereq. PSY 1112 or PSY 1113; PSY 1351 is highly recommended.*

PSY 1410 Systems and Theories of Psychology **4 QH**
Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq. Junior or senior status in psychology major or permission of instructor.*

PSY 1431 Behavior Therapies **4 QH**
Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq. PSY 1231 or permission of instructor.*

PSY 1442 Human Memory **4 QH**
Offers a detailed examination of how people learn and remember. Examines the different kinds of memory, short-term, episodic, and semantic, with emphasis on current theories of memory function and related experimental findings. *Prereq. PSY 1364 or PSY 1262.*

PSY 1451 Psychopharmacology **4 QH**
Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse. *Prereq. PSY 1351 or equiv. with permission of instructor.*

PSY 1499/LIN 1499 Psychology of Reading **4 QH**
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq. PSY 1262 or PSY 1364.*

Directed Studies — Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) **4 QH**
Honors equivalent of PSY 1110. (Core Category II)

PSY 1713 Perspectives in Psychology 2 (Honors) **4 QH**
Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study **4 QH**
For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 Directed Study **4 QH each**
Offers independent work under the direction of the psychology department, usually in a research project in one of the department labs. Faculty members normally require completion of advanced lab courses in the area of research interest, but this is a matter of individual discussion. Students interested in directed study should consult a departmental adviser. *Prereq. Permission of instructor.*

PSY 1895, PSY 1896, PSY 1897, PSY 1898 Junior/Senior Honors Program **4 QH each**
For details contact the honors office.

Laboratories

PSY 1511 Experimental Design in Psychology **4 QH**
Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq. PSY 1112 or PSY 1113 and PSY 1212.*

PSY 1530 Experiments in Learning and Motivation **4 QH**
Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles primarily through field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq. PSY 1231 and PSY 1211.*

PSY 1531 Learning and Motivation Laboratory **4 QH**
Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq. PSY 1212 and PSY 1231.*

PSY 1551 Laboratory in Psychobiology **4 QH**
Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq. PSY 1351 or permission of instructor.*

PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of

cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1364 or PSY 1262.*

PSY 1571 Laboratory in Social Psychology **4 QH**
Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq. PSY 1212 and PSY 1271.*

PSY 1572 Personality Laboratory **4 QH**
Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq. PSY 1212 and PSY 1272.*

PSY 1575/AFR 1575 Community Psychology Laboratory **4 QH**
Students reflect upon real-world obstacles in conducting independent field research in communities in and around Northeastern during the quarter. Student reflections are used to guide research design, to evaluate theory, and to problem-solve social problems. Research topics may focus on battered women, HIV, student stress, perceptions of the media, church involvement in dealing with stress, or topics affecting large minority populations. Evaluates student performance through class discussions and written research reports.

PSY 1581 Sensation and Perception Laboratory **4 QH**
Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq. PSY 1212 and PSY 1381 or PSY 1382.*

Seminars

PSY 1610 Psychological Research and Personal Values **4 QH**
Students identify and reflect upon ethical concerns (e.g., related to confidentiality, animal use, racism, designing and applying research) that they encountered in their prior co-op/research experiences. Considers historical, psychological, philosophical, sociological, and spiritual perspectives. Students use reflective conversation to guide their ethical thinking, research, and problem solving. Evaluates research projects through written and oral reports. *Prereq. Any laboratory course in psychology and research or co-op experience in psychology.*

PSY 1614 Seminar on Heredity and Society **4 QH**
Focuses on the origins of the intelligence testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq. Permission of instructor.*

PSY 1632 Seminar in Behavior Modification **4 QH**
Discusses topics in behavior modification in a seminar format. *Prereq. PSY 1231, PSY 1531, or permission of instructor.*

PSY 1651 Seminar in Psychobiology **4 QH**
Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq. PSY 1351 or permission of instructor.*

PSY 1661 Seminar in Psycholinguistics **4 QH**
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1662 Seminar in Cognition **4 QH**
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1671 Seminar in Social Psychology **4 QH**
Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq. PSY 1271 or permission of instructor.*

PSY 1672 Seminar in Clinical Psychology and Personality **4 QH**
Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq. PSY 1374 (may be taken concurrently).*

PSY 1681 Seminar in Sensation and Perception **4 QH**
Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and lawful manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq. PSY 1351 and PSY 1381 or PSY 1382.*

PSY 1990 and PSY 1991 Internship in Psychology **4 QH each**
Offers supervised experiences in the application of psychology in instructional, clinical, or other applied settings.

Note: PSY 1410, Systems and Theories of Psychology, also counts as a seminar.

Sociology

SOC 1100 Introduction to Sociology **4 QH**
Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life **4 QH**
Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1102 Social Inequality and Communication **4 QH**
Analyzes the ways in which groups and institutions, in both their ritual and everyday activities, communicate the idea of hierarchy and an individual's place in it through face-to-face interaction, formal communication, and the use of space and time. Takes a dramaturgical approach to social organization, with special emphasis on status images in the media and the communication of social place by service organizations and professional groups. Includes some content analysis and observational fieldwork.

SOC 1103 American Society **4 QH**
Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq. SOC 1100 or equivalent.*

SOC 1104 Contemporary Japanese Culture and Society **4 QH**
Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (Core Category IV)

SOC 1105 Society and Culture in Russia and the Former Soviet Union **4 QH**
Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (Core Category IV)

SOC 1120 Sociology of Boston **4 QH**
Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.

SOC 1121 Doing Sociology **4 QH**
Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use the computer during the course. (Core Category II)

SOC 1125 Social Problems **4 QH**
Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.

SOC 1135 Social Psychology **4 QH**
Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.

SOC 1140 Sociology of Prejudice and Violence **4 QH**
Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1146 Environment and Society **4 QH**
Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (Core Category VI)

SOC 1147 Urban Social Problems **4 QH**
Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality **4 QH**
See INT 1150 for course description.

SOC 1155 Sociology of the Family **4 QH**
Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (Core Category V)

SOC 1156 Violence in the Family **4 QH**
Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Gender in a Changing Society **4 QH**
Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.

SOC 1165 Students, Schools, and Society **4 QH**
Emphasizes the role of education in processes of socialization, social mobility, social control, and social change. Do social characteristics (sex, race, class, age, physical status) influence the school experience? Do schools provide opportunity and initiate change, or do they perpetuate the status quo in economic, political, and social life? Who goes to school, where, for how long, and with what result? How does educational advantage get translated into jobs and social status? Encourages students to draw on their own experiences to develop paper topics.

SOC 1168 The Social Movements of the 1960s **4 QH**
Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations **4 QH**
Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq. SOC 1100 or equivalent.*

SOC 1171 Race and Ethnic Relations: A World Perspective **4 QH**
Offers a cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Examines race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts.

SOC 1175 Sociology of Work **4 QH**
Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (Core Category VI)

SOC 1176 Sociology of Business/Industry **4 QH**
Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World **4 QH**
Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working **4 QH**
Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1180 Sociology of Consumerism and Consumer Behavior **4 QH**
Provides students with an opportunity to explore a relevant consumer issue.

SOC 1185 Deviant Behavior and Social Control **4 QH**
Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.

SOC 1190 Juvenile Delinquency **4 QH**
Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society **4 QH**
Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism **4 QH**
Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.

SOC 1201 Alcohol Use and Social Control **4 QH**
Examines how societies define and enforce rules on alcohol use, including the conditions under which controls, informal and formal, come into being, and the consequences of these controls. Examines case studies of Prohibition, liquor control, public drunkenness, alcoholism, legal drinking age, drinking and driving, and drinking in college.

SOC 1202 Sociology of Drinking **4 QH**
Examines how different groups and societies organize drinking as a social act and the consequences of that organization. Singles out for particular attention the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 1205 Law, Crime, and Social Justice **4 QH**
Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police **4 QH**
Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1215 Sociology of Health **4 QH**
Examines health and illness in the socio-political context. Focuses on the health professions, the health system, issues of cost, and availability of care. Compares the United States system with those of Western Europe, Eastern Europe, and the Third World. *Prereq. SOC 1100 or permission of instructor.*

SOC 1217 Women, Health, and Social Change **4 QH**
Examines how women have traditionally been viewed by the medical field and how reproduction and childbirth came to be defined as medical problems. Also examines the implications for women in the changes that have taken place in health care, especially as these pertain to new reproductive frontiers and alternative health care facilities. Discusses the role of women in the health care professions.

SOC 1225 Aging and Society **4 QH**
Surveys issues and questions on aging, with special attention to social and economic consequences of the aging process, including retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Presents examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Gives students the opportunity to learn to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients/patients.

SOC 1235 Death and Dying **4 QH**
Focuses on the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Discusses cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion,

suicide, and ceasing medical intervention. *Prereq. SOC 1100 or permission of instructor.*

SOC 1240/HS 1240 Sociology of Human Service Organizations **4 QH**
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty **4 QH**
Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1247 Food and Hunger **4 QH**
Examines the social causes and consequences of hunger and alternative approaches to solving world hunger.

SOC 1250 The Sociology of Private and Public Assistance **4 QH**
Helps students understand why public and private assistance in the United States takes the form it does. Examines the ideology behind the welfare system, the kinds of assumptions made about the poor, how other countries deal with the problem, the effects of poverty in the United States, and some explanations for its continuing existence.

SOC 1255 Sport in Society **4 QH**
Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1275 Sociology of the Arts **4 QH**
Examines the relation between the social organization of society and the forms of art produced—the social role of the artist, how the arts are "manufactured" and distributed, the art consumer's relation to art and the artist, social support for the arts. Deals with a variety of art forms, with emphasis on the performing arts.

SOC 1276 Sociology of Popular Culture **4 QH**
Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1284 Technology and Careers of the Future **4 QH**
Focuses on new technologies and their social impacts on work and careers in the future. Examines sociological and humanistic approaches to technical change in the shop floor, offices, and professions. Also covers issues of design and control, health, employment, and autonomy.

SOC 1285 Environment Technology and Society **4 QH**
Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological "fix" be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (Core Category VI)

SOC 1286 Science and Society **4 QH**
Examines the profound effects of science on our society, and the ways in which political, economic, and social forces have guided developments in science. Explores issues such as "responsibility" created by this interdependence. Emphasizes the social structures within which science operates and is communicated and science as an occupation and profession, as well as a system of thought and set of tools for producing knowledge. (Core Category VI)

SOC 1287 Society Tomorrow: Forecasting Alternative Futures **4 QH**
Introduces students to the area of "social futures" or "future studies." Examines the major techniques used to forecast futures and the specific scenarios and projections about the social world of tomorrow. Considers the major prospects and problems for society in the future.

SOC 1290 Military and American Society in a Nuclear Age **4 QH**
Investigates the relationship between the military and society. Covers selected issues, including the impact of the military on social institutions such as the family, polity, and economy, the arms race and upheaval in social life, the post-cold war legitimation crisis of the United States military, the role of women and minorities as reserve armies, and military spending and domestic social problems.

SOC 1300 Classical Social Thought **4 QH**
Traces the development of sociology from the history of social thought. *Prereq. Three sociology/anthropology courses.*

SOC 1301 Current Social Thought **4 QH**
Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq. Three sociology or anthropology courses.*

SOC 1302 Feminist Perspectives on Society **4 QH**
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the differences among women. (Core Category VI)

SOC 1310 Class, Power, and Social Change **4 QH**
Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (Core Category V) *Prereq. One sociology course and middler standing or permission of instructor.*

SOC 1320 Introduction to Statistical Analysis **4 QH**
Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq. SOC 1100 or permission of instructor.*

SOC 1321 Research Methods 1 **4 QH**
Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq. SOC 1100 and SOC 1320, or permission of instructor.*

SOC 1322 Research Methods 2 **4 QH**
Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq. SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.*

SOC 1324/HS 1260 Human Services Research and Evaluation **4 QH**
Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq. SOC 1320 or other statistics, SOC 1240, or permission of instructor.*

SOC 1325 Reporting on Society **4 QH**
Gives journalism students the opportunity to conduct participant observation research. Requires students to participate in and directly observe the activities of a small group as well as to analyze the group's culture from a sociological perspective. *Open to nonjournalism majors with instructor's permission.*

SOC 1335, SOC 1336 Group Behavior 1, 2 **4 QH each**
Explores how individuals interact in groups and how groups interact with each other. Focuses on the reflexive self, social aspects of language, situational learning, group perspectives, careers, institutions, and worlds.

SOC 1345 American Demographics **4 QH**
Offers an applied research experience in which students have the opportunity to study the major areas of demography. Focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.

SOC 1347 Community Analysis **4 QH**
Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1348 Seminar in Urban Studies **4 QH**
Compares interdisciplinary approaches to urban studies according to problem areas and research methods. Gives students the opportunity to extend previous term paper projects after exposure to social action and social systemic theoretical perspectives. *Prereq. SOC 1147 or permission of instructor.*

SOC 1350 Women in Jewish Culture **4 QH**
Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship of women to Judaism by trying to recover Jewish women's experiences in America since the turn of the century by looking at some key institutions—work, family, religion, the feminist movement, the media, literature, and film.

SOC 1355 Politics and Economy in U.S. Society **4 QH**
Examines the political economy of United States capitalism. Focuses on the impact of new forms of economic crisis on politics, social classes, labor, and the state.

SOC 1360 Social Class, Status, and Power **4 QH**
Focuses on theories of social inequality, concepts of social class, aspects of status and role difference, and criteria for social mobility.

SOC 1365 Collective Behavior **4 QH**
Focuses on the rise of new group forms in response to persistent social unrest; masses, crowds, and publics; specific instances of collective behavior such as race riots, wildcat strikes, prison revolts, and campus disorders.

SOC 1375 Sociology of Occupations and Professions **4 QH**
Considers occupations and professions as institutions in a broader socio-political context. Includes a historical and international perspective on topics such as training, professional associations, professional services, and the relation of professional groups to capitalism and to states. *Prereq. Four sociology or anthropology courses or permission of instructor.*

SOC 1376 Organization and Bureaucracy **4 QH**
Focuses on sociological study of organizations. Examines case studies of private corporations, federal bureaucracies, social service agencies, military-industrial complex, high-risk technological systems, unions. Analyzes recent theories of innovation, participation, and opportunity in complex organizations.

SOC 1385 Social Deviance 2 **4 QH**
Examines the leading theories of deviance (anomie, subcultural deviance, labeling) and their principal variants; studies their assumptions, conceptions, propositions, and supportive evidence; analyzes empirical studies in each theoretical tradition.

SOC 1470 Sociology of Religion **4 QH**
Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq. SOC 1100.*

SOC 1475 The Sociology of Mass Communication **4 QH**
Focuses on factors in the formation and development of public opinion, the effect of television on children, mass communication as social organization, media-depicted images of society, the role of personal influence, the process of rumor, the use of mass

media by the poor, propaganda analysis, and the latent and manifest functions of mass communication.

SOC 1485 Computers and Society **4 QH**
Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (Core Category VI) *Prereq. Junior in computer science or middler with ability to program.*

SOC 1500 Applied Sociology: Practice and Theory **4 QH**
The academic component of the experiential education requirement for sociology majors; to be taken after students have completed the experiential component. Provides a seminar format in which students will reflect upon their approved experience (e.g., co-op, internship, community service, etc.) and integrate it into a research project. Students who have completed study abroad or a service learning course in the department do not have to take this course. *Prereq. Sociology majors only.*

SOC 1501 Social Policy and Social Intervention (Formerly Social Control 2) **4 QH**
Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1525 Comparative Human Services 1 **6 QH**
Offers an intensive look at the American human services system. Gives upper-level undergraduate and graduate students the opportunity to study the origins, development, and present state of human services in the United States. Involves lectures as well as field visits in the Boston area. Provides independent study.

SOC 1526 Comparative Human Services 2 **6 QH**
Offers an intensive study of the British human services system. Provides students the opportunity to immerse themselves in the social and cultural context of British human services and involves field trips in London designed to examine firsthand the planning, administration, and delivery of human services in Great Britain.

SOC 1535 Seminar in Social Welfare **4 QH**
Discusses problems in social welfare observed in the term between "Problems" and "Practicum." Requires a research paper, based on directed fieldwork in the intervening term.

SOC 1601 Seminar in Current Emphases in Sociology **4 QH**
Reviews and discusses selected sociological topics. *Prereq. Junior or senior standing in sociology/anthropology or permission of instructor.*

SOC 1700 Introduction to Sociology (Honors) **4 QH**
Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors) **4 QH**
Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study **4 QH each**
Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq. Junior or senior standing in sociology or permission of instructor.*

SOC 1821, SOC 1822, SOC 1823, SOC 1824 **4 QH**
Junior/Senior Honors Project
For details contact the honors office.

Theatre

THE 1100 Introduction to Theatre Arts **4 QH**
Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (Core Category II)

THE 1106 Theatre History 1—Beginnings to Renaissance **4 QH**
Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

THE 1107 Theatre History 2—Renaissance to Naturalism **4 QH**
Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)

THE 1111 American Musical Theatre **4 QH**
Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.

THE 1112 Dramatic Theory and Criticism **4 QH**
Examines the major theoretical statements about Western theatre from Greece to present day. Devotes a significant portion of the course to twentieth-century critical strategies.

THE 1114 Masters of the Theatre **4 QH**
Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (Core Category III)

THE 1116 The American Theatre **4 QH**
Traces the historical development of theatre in America, as well as its role as a social institution, economic enterprise, and art form.

THE 1118 Black Theatre in America **4 QH**
Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's Dutchman.

THE 1121 Contemporary Theatre **4 QH**
Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth century American and European theatre.

THE 1127 The Comic Theatre **4 QH**
Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the comic director, and the comedic actor. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

THE 1140 Playwriting 1 **4 QH**
Offers students the opportunity to develop a series of dramatic dialogues that culminate in the writing of a one-act play. Uses a workshop format.

THE 1149 Script Analysis for the Stage **4 QH**
Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq. Theatre major or minor.*

THE 1150 Introduction to Acting **4 QH**
Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom of expression.

THE 1155 Voice for the Theatre **4 QH**
Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

THE 1160 Movement 1 **4 QH**
Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq. Theatre major or permission of instructor.*

THE 1180 Concepts of Direction **4 QH**
Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq. THE 1150 and THE 1212.*

THE 1200 Stagecraft **4 QH**
Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq. Theatre major or permission of instructor.*

THE 1209 Theatrical Drafting **4 QH**
Exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction through work on supervised classroom projects. *Prereq. THE 1200.*

THE 1210 Scenic Design for the Stage **4 QH**
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, etcetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq. THE 1200, THE 1212, or permission of instructor.*

THE 1212 Introduction to Theatrical Design **4 QH**
Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles **4 QH**
Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq. THE 1210.*

THE 1225 Scene Painting **4 QH**
Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq. THE 1200 or permission of instructor.*

THE 1226 Lighting Design for the Stage **4 QH**
Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq. THE 1200, THE 1212, or permission of instructor.*

THE 1261 Costuming 1 **4 QH**
Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction **4 QH**
Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup **4 QH**
Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq. Theatre major or permission of instructor.*

THE 1284 Theatre Management **4 QH**
Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre **4 QH**
Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2 **4 QH**
Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq. THE 1150 and permission of department chair.*

THE 1301 Acting 3 **4 QH**
Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq. THE 1300 and permission of instructor.*

THE 1302 Acting 4 **4 QH**
Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq. THE 1301 and permission of instructor.*

THE 1316 Acting for the Camera (Television) **4 QH**
Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq. THE 1155, THE 1160, and THE 1302.*

THE 1325 Musical Theatre Technique **4 QH**
Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. *Prereq. THE 1150, THE 1300, and permission of instructor.*

THE 1370 Rehearsal and Performance **4 QH**
Requires students to research, prepare, and perform either a substantial acting role, a design assistantship, a crew head, a dramaturgy, or a stage management position under the direction and guidance of faculty. Students are expected to keep a rehearsal log and will synthesize and evaluate the experience in a final paper. This course may be repeated for credit up to three times for theatre majors. *Prereq. Permission of instructor.*

THE 1400 Costuming 2 **4 QH**
Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq. THE 1261 or permission of instructor.*

THE 1410 Technical Production **4 QH**
Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq. All courses in production/design concentration and permission of instructor.*

THE 1420 Advanced Drafting and Construction **4 QH**
Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. *Prereq. THE 1209.*

THE 1430 Lighting Design 2 **4 QH**
Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq. THE 1226.*

THE 1505 Continental Drama **4 QH**
Covers seminal late nineteenth- and mid-twentieth-century continental drama. Focuses on playwrights whose plays had a major impact on modern drama and theatre.

THE 1510 Twentieth Century Theatre **4 QH**
Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

THE 1511 Theatre Through the Lens of Modernism **4 QH**
Covers seminal playwrights of the late nineteenth and twentieth centuries whose works have had a major impact on both modern drama and theatrical methods of production. (Core Category V)

THE 1800, THE 1801, THE 1802, THE 1803 **1 QH each**
Practicum in Production
Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq. Departmental permission.*

THE 1810, THE 1811, THE 1812, THE 1813 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

THE 1820, THE 1821, THE 1822, THE 1823 **4 QH each**
Directed Study

THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849 **4 QH each**
Special Topics in Theatre Performance
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 **4 QH each**
Special Topics in Theatrical Design
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1890, THE 1891, THE 1892, THE 1893 **4 QH each**
Special Topics in Theatre History/Dramatic Criticism
Offers opportunity for in-depth examination of a subject of particular significance to the field.

Business Administration

Accounting

ACC 1111 Financial Accounting **4 QH**
Covers the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. *Prereq. Sophomore standing.*

ACC 1112 Managerial Accounting **4 QH**
Introduces students to managerial accounting concepts and analysis reports and decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of cash flows; cost management and behavior; cost-volume-profit analysis; ABC accounting; and relevant costs for decisions. *Prereq. ACC 1111 and sophomore standing.*

ACC 1331 Intermediate Accounting 1 **4 QH**
Constitutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq. ACC 1111 or equivalent and middler standing.*

ACC 1332 Intermediate Accounting 2 **4 QH**
Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Specific topics include fixed asset and intangible asset accounting, current and long-term liabilities, contingencies, pensions and other post-employment benefits, and leases. *Prereq. ACC 1331 and middler standing.*

ACC 1339 Cost Accounting **4 QH**
Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq. ACC 1112 and middler standing.*

ACC 1343 Intermediate Accounting 3 **4 QH**
Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq. ACC 1332 or permission of instructor.*

ACC 1345 Accounting Systems **4 QH**
Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach to consider the appropriate use of computer technology in designing new systems. Covers system analysis and design concepts, files and database design, and how to control specific accounting applications. Provides hands-on experience in operating a computerized accounting system. *Prereq. ACC 1331, introductory computer course, or permission of instructor, and middler standing.*

ACC 1347 Auditing **4 QH**
Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq. ACC 1332 or ACC 1343.*

ACC 1351 Federal Income Taxes 1 **4 QH**
Emphasizes basic understanding of the federal income tax structure relating to individuals. Requires completion of tax return problems and research cases directed at addressing various tax situations. Through these projects, the different sources of tax authority are introduced. *Prereq. ACC 1332 or permission of instructor.*

ACC 1512 Federal Income Taxes 2 **4 QH**
Continues the examination of the federal income tax system. Emphasizes the tax implications of property transactions and choice of business entity. Transactions between owners and business entities are also examined. A major emphasis is given to tax planning considerations, especially corporate tax consequences. *Prereq. ACC 1351.*

ACC 1521 Advanced Accounting **4 QH**
Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships; business combinations and consolidated financial statements; bankruptcy, liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and accounting for governmental units. *Prereq. ACC 1343 or permission of instructor.*

ACC 1591 Independent Study **1 QH**
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study **2 QH**
Same as ACC 1591.

ACC 1593 Independent Study **3 QH**
Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study **4 QH each**
Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors) **4 QH**
See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors) **4 QH**
See course description for ACC 1112.

ACC 1891 Honors Thesis in Progress **0 QH**

ACC 1892 Honors Thesis **8 QH**

ACC 1893 Honors Thesis in Progress **0 QH**

ACC 1894 Honors Thesis **12 QH**

Entrepreneurship

ENT 1330 Entrepreneurship **4 QH**
Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business **4 QH**
Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures **4 QH**
Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute **8 QH**
Provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Sponsored by the United States Small Business Administration (SBA). Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq. Junior standing or permission of instructor.*

ENT 1591 Independent Study **1 QH**
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study **2 QH**
Same as ENT 1591.

ENT 1593 Independent Study **3 QH**
Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study **4 QH each**
Same as ENT 1591.

ENT 1598 Independent Study **8 QH**
Same as ENT 1591.

ENT 1891 Honors Thesis in Progress **0 QH**

ENT 1892 Honors Thesis **8 QH**

ENT 1893 Honors Thesis in Progress **0 QH**

ENT 1894 Honors Thesis **12 QH**

Finance and Insurance

FIN 1333 Financial Institutions and Markets **4 QH**
Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq. ACC 1112 and middler standing.*

FIN 1335 Managerial Finance **4 QH**
Provides students the opportunity to gain knowledge of the advanced tools and concepts used in the financial management of the firm. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq. FIN 1439.*

FIN 1346 Investment Management **4 QH**
Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq. FIN 1439.*

FIN 1438 Principles of Finance 1 **4 QH**
Analyzes financial statements of the firm with emphasis on long-term planning and financing, financial policy, and short-term planning. Covers both international corporate finance and ethics in finance. Places strong emphasis on the link of finance to other functional areas such as strategy, marketing, operations, and accounting. *Prereq. ACC 1112, FIN 1438, MSC 1201.*

FIN 1439 Principles of Finance 2 **4 QH**
Introduces students to financial markets and financial institutions. Familiarizes students with security market operations and financial assets. Covers interest rate theory, risk and return, diversification, and equilibrium models of the risk-return trade-off. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq. ACC 1112, MSC 1201, and middler standing.*

FIN 1503 Taxes and Financial Decisions **4 QH**
Uses the case method to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies, and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq. FIN 1439 and middler standing.*

FIN 1520 Options and Futures Markets **4 QH**
Explores the concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage risk. Topics include mechanics of these markets, techniques that can hedge risk exposure, tracing methods, and current developments in the field. *Prereq. FIN 1346.*

FIN 1526 Securities Markets **4 QH**
Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq. FIN 1439.*

FIN 1530 Working Capital Management **4 QH**
Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq. FIN 1439.*

FIN 1531 Capital Investment Decision Analysis **4 QH**
Explores recent developments in financial management and financial analysis through the use of modern finance theory to make capital allocation decisions that lead to long-run value maximization for the corporation. Focuses on applications and financial model building. Examines risk analysis for capital investment decisions by building spreadsheet models and utilizing computer simulation methods as a risk analysis tool. Studies the useful applications of risk analysis methods in other areas of corporate finance and investments, e.g., investment analysis and portfolio management. Utilizes valuation analysis models to merge financial, corporate, and business strategies to measure and manage the value of a corporation. Presents materials relevant to corporate managers interested in value-based management systems and to securities analysts. *Prereq. FIN 1439.*

FIN 1535 Issues in Corporate Control **4 QH**
Examines the nature of conflicts over control of the corporation. Applies modern finance theory and practice to the issues raised and draws on seminal works in the finance and economics literature that influence the current debates in this area. Discusses legal and ethical considerations that are especially important in corporate control issues. Uses cases involving well-known takeovers of the 1980s as well as current hostile takeover battles to illustrate the theories discussed. *Prereq. FIN 1439.*

FIN 1540 Management of Financial Institutions **4 QH**
Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq. FIN 1439 or FIN 1333.*

FIN 1543 Modern Portfolio Management **4 QH**
Analyzes the process of constructing and managing an asset portfolio to meet stated objectives. Exposes students to theoretical models of portfolio choice and statistical analysis of appropriate data. Offers students the opportunity to design a portfolio that combines theory with the practice of portfolio management in an international context. Covers performance evaluation. *Prereq. FIN 1346.*

FIN 1544 Bank Management **4 QH**
Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and investment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq. FIN 1439 or FIN 1333.*

FIN 1545 Investment Banking **4 QH**
Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq. FIN 1439.*

FIN 1549 Principles of Real Estate **4 QH**
Surveys the field of real estate, including principles of real estate law, transactions, brokerage, management, development, valuation, taxation, finance, and investment. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq. FIN 1439.*

FIN 1550 Real Estate Finance and Investment **4 QH**
Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and secondary mortgage markets. Surveys methods of valuing income properties. *Prereq. FIN 1549.*

FIN 1562 Employee Benefits Management **4 QH**
Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of

qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq. FIN 1439.*

FIN 1566 Risk Management and Insurance **4 QH**
Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq. FIN 1439.*

FIN 1580 Personal Financial Management **4 QH**
Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq. FIN 1438.*

FIN 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study **2 QH**
Same as FIN 1591.

FIN 1593 Independent Study **3 QH**
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study **4 QH each**
Same as FIN 1591.

FIN 1739 Principles of Finance 2 (Honors) **4 QH**
Analyzes financial statements of the firm with emphasis on long-term planning and financing, financial policy, and short-term planning. Covers both international corporate finance and ethics in finance. Places strong emphasis on the link of finance to other functional areas such as strategy, marketing, operations, and accounting. *Prereq. ACC 1112, FIN 1438, MSC 1201.*

FIN 1759 International Financial Markets **4 QH**
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq. FIN 1439.*

FIN 1760 International Financial Management **4 QH**
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq. FIN 1759.*

FIN 1770 Entrepreneurial Finance **4 QH**
Provides a summary overview of entrepreneurial finance with a specific focus on small businesses, corporate ventures, and intrapreneurship. Applies knowledge of corporate finance in the context of starting, acquiring, managing, and divesting a business or a business unit within a corporation. Covers such topics as analyzing the financial needs of new ventures, sources of financing, managing decline, valuation, and exit strategies. Provides students with the opportunity to work with College of Engineering students in a special project funded by the General Electric Foundation.

FIN 1814 Financial Forecasting **4 QH**
Discusses how accurate forecasts of product demand, retail sales, and cash-flow levels are critically important for companies regardless of size. Covers how effective financial forecasting integrates macroeconomic factors, particularly the business cycle, and institutional factors with appropriate quantitative methods. Addresses both issues—economic or business cycles and forecasting techniques—in sufficient depth so that students can obtain the skills necessary to build and interpret a basic forecasting model for business. *Prereq. Honors participation or permission of instructor.*

FIN 1818 Turnaround Management (Honors) **4 QH**
Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq. Honors participation or permission of instructor.*

FIN 1820 Fixed Income Securities and Risk **4 QH**
Exposes students to theory, applications, and evidence concerning highly sensitive interest rate products. Teaches recent developments in pension fund management, asset/liability management, duration matching, "gap" management, concurrent interest rate and exchange rate management, and other important issues confronting domestic and international financial and corporate management. Students can learn how to customize a risk management program. *Prereq. FIN 1346.*

FIN 1891 Honors Thesis in Progress **0 QH**

FIN 1892 Honors Thesis **8 QH**

FIN 1893 Honors Thesis in Progress **0 QH**

FIN 1894 Honors Thesis **12 QH**

Human Resources Management

HRM 1332 Introduction to Human Resources Management **4 QH**
Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq. Middler standing.*

HRM 1345 Managing Employee Relations **4 QH**
Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq. Middler standing.*

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration **4 QH**
Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq. Middler standing.*

HRM 1349 Selection and Assessment of Employees **4 QH**
Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. Middler standing.*

HRM 1350 Skills of Leading and Managing **4 QH**
Identifies the basic behavioral skills of the manager and leader role. Engages students in a number of activities that will provide the opportunity to develop those skills, including motivating, supervising, communicating, resolving conflict, leading, coaching, and negotiating. Emphasizes self-assessment and experiential exercises aimed at skill development.

HRM 1432 Organizational Behavior **4 QH**
Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing. (Not open to College of Business Administration students.)*

HRM 1433 Organizational Behavior and Design **8 QH**
Helps managers and potential managers develop people skills. Focuses on the individual, interpersonal, group, and organizational level. Uses case studies, simulation, role playing, and theory to help students learn concepts and techniques of managing with and through people. Develops skills through practice. *Prereq. Middler standing.*

HRM 1519 Leadership **4 QH**
Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1587 Training and Development **4 QH**
Explores contemporary methods for developing and delivering training programs that enhance performance at both an individual and organizational level. Emphasizes practical application in the areas of need analysis, curriculum design, learning objectives, program development, materials preparation, training interventions, course evaluation, and facilitation skills. Gives students the opportunity to develop, conduct, and evaluate training sessions. *Prereq. HRM 1433.*

HRM 1591 Independent Study **1 QH**
Allows a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study **2 QH**
Same as HRM 1591.

HRM 1593 Independent Study **3 QH**
Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 Independent Study **4 QH each**
Same as HRM 1591.

HRM 1760 International Labor Relations Systems **4 QH**
Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings **4 QH**
Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1891 Honors Thesis in Progress **0 QH**

HRM 1892 Honors Thesis **8 QH**

HRM 1893 Honors Thesis in Progress **0 QH**

HRM 1894 Honors Thesis **12 QH**

International Business Administration

INB 1338 Introduction to International Business **4 QH**
Focuses on the broad cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; and the development of management strategies for international businesses. *Prereq. Middler standing.*

INB 1352 Seminar in International Business **4 QH**
Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing. INB 1338 strongly recommended.*

INB 1731 Cultural Aspects of International Business **4 QH**
Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management **4 QH**
Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

MGT 1115 Introduction to Business **4 QH**
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business **4 QH**
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1350 Advanced Strategic Management **4 QH**
Emphasizes the systems designed by managers to facilitate organizational change and effective strategy implementation. Develops a framework for understanding and managing the complex interrelationships that exist among strategy, structure, culture, control systems, and management style, and their impact on the organization's performance, through readings and case discussions. Includes exploration of current strategic management issues, such as global expansion, corporate renewal, quality assurance, innovation and technology, strategic alliances, project management, and integrating functional perspectives, through discussion of current and classic strategic management writings. *Prereq. MGT 1450.*

MGT 1446 Managing Legal, Ethical, and Social Issues **4 QH**
Focuses on the legal, social, ethical, and economic influences as well as domestic and international cultural factors affecting business. Treats various ways the manager can respond to these influences. Topics include the several possible models of the business and society relationship; the foundations of personal and managerial ethics; the business, government, and society interrelationships; ways the manager can address various stakeholder interests; and strategic and corporate public policy consequences of management's responses to specific social issues. *Prereq. Junior standing.*

MGT 1450 Business Policy **4 QH**
Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq. Senior standing.*

MGT 1575 Negotiations **4 QH**
Focuses attention on the strategies and techniques employed in the negotiations process. Includes familiarization with related literature, student role-playing, and interaction with professionals involved in private and public sector negotiations.

MGT 1580 Intercultural Negotiation and Conflict **4 QH**
Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.

MGT 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MGT 1592 Independent Study **2 QH**
Same as MGT 1591.

MGT 1593 Independent Study **3 QH**
Same as MGT 1591.

MGT 1594, MGT 1595, MGT 1596, MGT 1597 **4 QH each**
Independent Study
Same as MGT 1591.

MGT 1720 Labor Law **4 QH**
Helps acquaint the student with the many constitutional and legal problems involved in labor organizing, industrial relations, labor negotiations, labor contract enforcement, and dispute resolution. Examines cases for the legal principles underlying the common law, state and federal laws, and the constitutional questions of power and authority. Also considers the Sherman Act, Clayton Act, Norris-LaGuardia Act, and Labor Management Relations Act. *Prereq. Middler standing.*

MGT 1820 Independent Study (Honors) **4 QH**
Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.

MGT 1831 International Competitiveness in a Global Economy **4 QH**
Introduces students to the evolution and growing interdependence of the global economy, especially the increasing number of regional trading arrangements such as NAFTA, GATT, APEC, and Mercosur. Analyzes the international competitiveness issues addressed in such arrangements to show students how governments influence national and world economies as well as the global competitiveness of an individual corporation. Includes readings, case studies, and guest speakers. May entail one or two overnight field visits within the United States and/or Canada over a weekend. *Prereq. Honors participation or permission of instructor.*

MGT 1838 Corporate Renewal through New Product Development **4 QH**
Provides an overview of the key issues facing technology-based firms. Addresses the following challenges from the perspectives of both the small start-up and the large corporation seeking to renew itself: the threat of technological discontinuities for existing business; the renewal of product architectures; identifying and understanding markets for new technologies; the linkage between design and manufacturing to achieve value cost advantage; and applications of product concepts to software, information products, and services. *Prereq. Honors participation or permission of instructor.*

MGT 1891 Honors Thesis in Progress **0 QH**

MGT 1892 Honors Thesis **8 QH**

MGT 1893 Honors Thesis in Progress **0 QH**

MGT 1894 Honors Thesis **12 QH**

Management Science

MSC 1200 Business Statistics 1 **4 QH**
Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. *Prereq. MTH 1114.*

MSC 1201 Business Statistics 2 **4 QH**
Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time series analysis. *Prereq. MSC 1200.*

MSC 1226 Computer-Based Information Systems **4 QH**
Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to analyze a business case, applying their technology and problem-solving skills.

MSC 1330 Data Management **4 QH**
Builds on the functional skills learned in MSC 1226. Exposes students to the essentials of data management. Topics include database design, selection and use of a database software package, database administration security, privacy, and data recovery. *Prereq. MSC 1226.*

MSC 1332 Decision Support Systems for Business **4 QH**
Provides students with an understanding of the impact of computer-based tools on business decision making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision support software such as graphics and expert systems on both mainframe and microcomputers. Gives students the opportunity to build a decision support system and create the supporting system documentation and user manual in a course project. *Prereq. MSC 1226.*

MSC 1335 Telecommunications and Networks **4 QH**
Reviews business telecommunications. Focuses on the design, use, and management of networks. Topics include telecommunications technology, network structures, and current telecommunication applications in business such as electronic mail, teleconferencing, and distributed applications. *Prereq. MSC 1226.*

MSC 1336 Business Programming **4 QH**
Provides students with experience in structured reasoning and programming. Builds upon the skills mastered in MSC 1330. Gives students the opportunity to gain an appreciation for design, coding, debugging, and executing program modules. Emphasizes the design discipline required to create such modules and the productivity gain that can be realized by employing object modules of this type in a business setting. *Prereq. MSC 1226, MSC 1330.*

MSC 1341 Information Resource Management **4 QH**
Examines the major organizational and managerial issues associated with managing the information resource focusing on three thematic components. Gives students the opportunity to assume a strategic viewpoint and consider using information to achieve competitive advantage, create new products or services, or to reengineer the business; learn about using information technology to support the functional areas of the business such as finance, manufacturing, or human resources; consider issues related to managing information technology such as outsourcing IS applications, project management, and investing in new technology. *Prereq. MSC 1226 and junior standing.*

MSC 1342 Business Systems Integration **4 QH**
Explores strategies for the functioning integration of information systems in both the office and the factory. Explores strategies for systems integration through a project requiring students to form companies, analyze their data needs, design and build a set of information systems, and recommend a strategy for data architec-

ture integration. This is the capstone course for the MIS concentration. *Prereq. MSC 1226, MSC 1330, MSC 1332, MSC 1335, MSC 1341. Suggested MSC 1336.*

MSC 1433 Quantitative Models in Business **4 QH**
Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Covers decision trees, decision analysis, linear programming, and simulation. *Prereq. MSC 1201.*

MSC 1441 Operations Management **4 QH**
Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications.

MSC 1566 Quality Management **4 QH**
Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of quality experts such as Deming, Juran, and Ishikawa. *Prereq. MSC 1201 and MSC 1441.*

MSC 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study **2 QH**
Same as MSC 1591.

MSC 1593 Independent Study **3 QH**
Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study **4 QH each**
Same as HRM 1591.

MSC 1701 Business Statistics 2 (Honors) **4 QH**
See course description for MSC 1201.

MSC 1826 Business Forecasting (Honors) **4 QH**
Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that involve forecasting. *Prereq. MSC 1201.*

MSC 1891 Honors Thesis in Progress **0 QH**

MSC 1892 Honors Thesis **8 QH**

MSC 1893 Honors Thesis in Progress **0 QH**

MSC 1894 Honors Thesis **12 QH**

Marketing

MKT 1331 Marketing Management **4 QH**
Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 1435 and middler standing.*

MKT 1341 Marketing Research **4 QH**
Focuses on the survey research process and the analysis of data using SPSS. Covers topics such as problem definition, research design, sampling, questionnaire design, data collection, and data analysis. Students expected to work on group projects. Requires no previous computer experience. *Prereq. MKT 1331 and MSC 1201.*

MKT 1351 Competitive Strategy **4 QH**
A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq. MKT 1331 and senior standing.*

MKT 1435 Introduction to Marketing **4 QH**
Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing.*

MKT 1501 Introduction to Retailing **4 QH**
Explores the dynamics of retailing and the range of firms that make up the retailing industry. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing, and retailing's role in the economy. *Prereq. MKT 1435 and middler standing.*

MKT 1503 Retail Merchandising and Control **4 QH**
Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq. MKT 1435 or permission of instructor.*

MKT 1515 Marketing in the Service Sector **4 QH**
Provides a basic treatment of methods and techniques for marketing in the service sector, which includes sports, recreation, public service, banking, insurance, and hotels. Analyzes a number of

descriptive studies covering the application of marketing principles in key service areas as well as the principles themselves.

MKT 1523 Advertising Management **4 QH**
Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq. MKT 1331 and middler standing.*

MKT 1531 Sales Management **4 QH**
Provides training in effective selling skills and how to manage accounts. Discusses how customers buy products and services and how this relates to a company's sales process: prospecting accounts, making sales presentations, handling customer objections, closing sales, and post-sale servicing of accounts. Also covers current approaches such as relationship and partnership selling. *Prereq. MKT 1331 and middler standing.*

MKT 1542 Business-to-Business Marketing **4 QH**
Examines corporate buyers and how they differ from household buyers/consumers. Studies company-to-company marketing and how it differs from consumer products marketing. Covers product and pricing elements as well as the role of industrial distributors and sales organizations. *Prereq. MKT 1331 and middler standing.*

MKT 1545 New Product Development **4 QH**
Focuses on the challenges and decisions managers face in creating, developing, launching, and managing new products and services. Special emphasis is given to the stages of the new product development process, the information needs in each stage, and approaches for gathering needed information. *Prereq. MKT 1331.*

MKT 1553 Foundations of Consumer Behavior **4 QH**
Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq. MKT 1331 and middler standing.*

MKT 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MKT 1592 Independent Study **2 QH**
Same as MKT 1591.

MKT 1593 Independent Study **3 QH**
Same as MKT 1591.

MKT 1594, MKT 1595, MKT 1596, MKT 1597 Independent Study **4 QH each**
Same as HRM 1591.

MKT 1735 Introduction to Marketing (Honors) **4 QH**
Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through discussions, lectures, readings, and group projects. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing and honors participation.*

MKT 1760 International Marketing **4 QH**
Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq. MKT 1331 and middler standing.*

MKT 1891 Honors Thesis in Progress **0 QH**

MKT 1892 Honors Thesis **8 QH**

MKT 1893 Honors Thesis in Progress **0 QH**

MKT 1894 Honors Thesis **12 QH**

Logistics and Transportation

TRN 1333 The Transportation Industries **4 QH**
Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.

TRN 1335 Current Issues in Logistics and Transportation **4 QH**
Identifies important contemporary issues and problems in logistics and transportation and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.

TRN 1344 Business Logistics **4 QH**
Analyzes the role and activities of those involved in corporate logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems.

TRN 1352 Advanced Problems in Logistics and Transportation **4 QH**
Identifies and examines important logistics and transportation issues that are of strategic importance to logistics professionals and carrier managers. Emphasizes the decision-making processes employed by top-level executives in the field. Focuses on the policy formulation process.

TRN 1353 Seminar in Logistics and Transportation **4 QH**
Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government through individual research topics selected for class presentation/discussion. *Prereq. Senior standing or permission of instructor.*

TRN 1514 Carrier Management **4 QH**
Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection.

TRN 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

TRN 1592 Independent Study **2 QH**
Same as TRN 1591.

TRN 1593 Independent Study **3 QH**
Same as TRN 1591.

TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study **4 QH each**
Same as TRN 1591.

TRN 1760 Global Logistics **4 QH**
Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.

TRN 1891 Honors Thesis in Progress **0 QH**

TRN 1892 Honors Thesis **8 QH**

TRN 1893 Honors Thesis in Progress **0 QH**

TRN 1894 Honors Thesis **12 QH**

Computer Science

COM 1100 Fundamentals of Computer Science **4 QH**
Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses character strings and 1-dimensional arrays. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components. *Prereq. An interest in programming computers.*

COM 1101 Algorithms and Data Structures 1 **4 QH**
Introduces algorithms, data structures, abstraction, and encapsulation. Examines arrays, stacks, classes, and templates. Discusses the creation of a data structure in layers using composition of simpler components. Uses the concept of class and template to encapsulate the functions and operations on a data structure. Studies specific classes for arrays, stacks, queues, complex arithmetic, polynomials, and function objects. Introduces dynamic memory allocation for arrays and simple linked lists. Examines sorting and searching techniques and introduces recursion. *Prereq. COM 1100 or equivalent.*

COM 1102 Functional Programming and Its Applications **4 QH**
Introduces the fundamental concepts and applications of functional programming based on procedural and data abstraction. Discusses the relation between functional programming and symbolic processing as implemented in LISP-like languages. Covers simple applications selected from artificial intelligence, data-driven design, and programming language design and implementation. *Prereq. COM 1101.*

COM 1105 Computer Science and Its Applications **4 QH**
Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem-solving process. Discusses basic principles and provides hands-on experience with a word processor, a spreadsheet package, a database management system, and a presentation manager. *Not open to computer science or business administration majors.*

COM 1121 Computer Science Overview 1 **1 QH**
Introduces ideas and skills that are necessary for success in the computer science field. Examines the relation between personal goals and professional standards. Studies work habits, time management, organizational skills, interpersonal skills, and commitment. Raises issues of ethics and responsibility. Discusses thinking skills that are needed in computer science and introduces problem-solving exercises designed to develop these skills. Introduces readings from the software literature to illustrate the variety of skills needed in industry. *Prereq. Computer science majors only.*

COM 1122 Computer Science Overview 2 **1 QH**
Introduces the UNIX operating system, the Internet, and other important systems. Discusses their basic concepts and history. Introduces ethical issues such as privacy, security, reliability, and intellectual property. *Prereq. Computer science majors only.*

COM 1130 Computer Organization and Design **4 QH**
Discusses how a computer system works and why it performs as it does. Topics include assembly language (programs, call/return, stack frames), arithmetic (representations and algorithms), digital design (implementation of an RISC subset), and organization (memory hierarchy). *Prereq. COM 1101 or permission of instructor.*

COM 1201 Algorithms and Data Structures 2 **4 QH**
Continues the study of algorithms, data structures, abstraction, and encapsulation. Introduces structures that utilize arrays and/or links in more sophisticated ways. Studies linked lists, trees, heaps, priority queues, and hashing. Discusses efficient sorting (quicksort and heapsort) and introduces experimental analysis or algorithms. Examines several design issues, including selection of structures based on what operations need to be optimized (insertion, deletion, traversal, searching, sorting, evaluation), encapsulation of algorithms using class and template techniques, and how and when to use recursion (versus explicit stack-based techniques). Introduces graph algorithms and structures if time permits. *Prereq. COM 1101 or equivalent.*

COM 1204 Object-Oriented Design **4 QH**
Introduces the philosophy and methodology of object-oriented software design and the techniques of object-oriented programming. Discusses the design and implementation of individual classes and the tradeoffs in designing collections of classes. Introduces class libraries and application frameworks. Examines simple design patterns and compares object-oriented design to other software design paradigms. Applies object-oriented design to several medium-sized projects. *Prereq. COM 1201 or permission of instructor.*

COM 1205 Software Design and Development **4 QH**
Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq. COM 1201, COM 1204.*

COM 1230 Introduction to UNIX Tools **4 QH**
Introduces the essentials of UNIX tool programming (with a bent towards systems administration) via the use of high-level programming languages, utilities, and toolkits. Topics include UNIX shells and essential utilities, Perl, Tcl/Tk, system and network security issues, and high-level networking and protocol basics. Provides students with an opportunity to learn the tools and programming languages that will help them make the best use of UNIX (and the myriad other operating systems where the tools have been ported). *This course does not qualify as a computer science elective, but computer science majors may take this course as a free elective.*

COM 1315 Database Design **4 QH**
Focuses on the use and properties of relational database management systems. Uses the entity-relationship model on example problems. Presents the SQL language. Topics may include indexing, query optimization, and object-oriented databases. Requires implementing a database schema and writing a short application program on a commercial database management system. *Prereq. COM 1101 or programming experience in a high-level language. Nonmajors with programming experience in C are welcome.*

COM 1317 Transaction Processing Systems **4 QH**
Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall

architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq. COM 1130, COM 1201, and COM 1315.*

COM 1330 Operating Systems **4 QH**
Introduces the basic concepts underlying computer operating systems and provides hands-on experience with their implementation. Covers the basic structure of an operating system: hardware and application interfaces, processes, threads, synchronization, interprocess communication, processor allocation, deadlocks, memory management, file systems, and input/output control. Uses examples from many real operating systems (UNIX, MS-DOS, Windows NT) to reinforce concepts. *Prereq. COM 1130 and COM 1201.*

COM 1335 Distributed Operating Systems **4 QH**
Covers distributed operating systems; communication: ATM, client-server, remote procedure call; processors, processes, and threads; distributed file systems; security. Uses case studies. Includes programming on workstations in labs. *Prereq. COM 1330.*

COM 1337 Computer Communication Networks **4 QH**
Introduces the underlying concepts and principles of computer networks. Presents the different components of a network and how these components fit together. Emphasizes the design and implementation of network software that transforms raw hardware into a richly functional communication system. Real networks (such as the Internet, ATM, Ethernet, Token Ring) will be used as examples to reinforce the concepts and demonstrate various protocols. Also covers applications such as electronic mail and the World Wide Web. Topics include introduction to communications connectivity and standards; layered architectures; ISO/OSI and TCP/IP reference models; data transmission, synchronization, and multiplexing; error handling, link control, and protocol operations; local area networks; network interconnection; high-speed networks; wide area networks; internetworking; transport layer services; and higher layers and applications. *Prereq. COM 1330.*

COM 1350 Automata and Formal Languages **4 QH**
Covers finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; Turing machines, Church's thesis, and the halting problem; and applications to compilers, artificial intelligence, and pattern recognition. *Prereq. COM 1201 and MTH 1137.*

COM 1355 Compiler Design 1 **4 QH**
Implements lexical analyzers and parsers as specified by regular expressions and context-free grammars. Emphasizes the use of LALR(1) or LL(1) parser generators. Covers basic code generation. Uses a hands-on approach, including either a sequence of programming assignments or a project. *Prereq. COM 1130 and COM 1350.*

COM 1358 Analysis of Programming Languages **4 QH**
Covers run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq. COM 1102 and COM 1350.*

COM 1370 Computer Graphics **4 QH**
Focuses on characteristics and programming of graphics output devices. Presents basic point and line drawing, two-dimensional displays; clipping and windowing. Surveys pictures; data structures and display file organization; and interaction; graphical input and event-driven programs. Includes some three-dimensional drawing. *Prereq. COM 1201 and MTH 1301.*

COM 1390 Algorithms **4 QH**
Introduces the basic principles and techniques for the discovery, design, analysis, and implementation of efficient algorithms. Sample algorithms will be drawn from sorting and searching, graph algorithms, string matching algorithms, greedy algorithms, and dynamic programming. Analysis will use both theoretical and experimental techniques. The course will conclude with a discussion of "hard problems" for which no efficient algorithms are known and will introduce the concept of NP-complete problems. *Prereq. COM 1350.*

COM 1400 Data Parallel Computing **4 QH**
Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines (with mesh or hypercube interconnections) and networks of workstations. Studies fundamental data structures and data parallel algorithms for matrix operations and fast fourier transforms. Examines graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments. *Prereq. COM 1390, MTH 1125, and MTH 1301.*

COM 1410 Artificial Intelligence **4 QH**
Focuses on approaches to making computers act intelligently by studying current methods for automated understanding, problem solving, optimal search, knowledge representation, vision, and learning. Students perform experiments with semantic nets, logical deduction systems, evidential reasoning systems, and/or neural nets. *Prereq. COM 1102, COM 1201.*

COM 1420 Principles and Methods in Interactive Systems Design **4 QH**
Introduces principles of human-computer interface design and methodologies of implementation, evaluation, and research in human-computer interaction. Topics include user psychology, dialog styles (menus/controls, command languages, icons, windows); screen layout and design, input devices (mouse, touch-screen, keyboard, voice); error handling and reporting; system response time; user documentation and help systems; and "intelligent" interfaces. Discusses techniques for the implementation and usability testing of human-computer interfaces. *Prereq. COM 1204 and COM 1370.*

COM 1621 Computer Science Seminar **1 QH**
Prepares students in methods of oral presentation of a topic in computer science. Describes techniques in preparation of overheads and other visual aids and their appropriate and effective use. Requires students to give a 20–30 minute oral presentation with overheads on a topic of their choice. *Prereq. Computer science seniors only.*

COM 1721, COM 1722, COM 1723 **1 QH each**
Freshman Honors Seminar 1, 2, and 3
Offers a seminar course for freshman honors students in com-

puter science and for freshman honors students in other majors who are concurrently taking COM 1100, COM 1101, or COM 1201 respectively, or who have completed these courses. Introduces a variety of topics that extend the material in the standard freshman computer science courses or go beyond the scope of these courses. *Prereq. Enrollment in the honors program or permission of the instructor.*

COM 1770 Computer Science Seminar (Honors) **4 QH**
Offers a capstone course for computer science honors students. Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic. *Prereq. Computer science seniors in the honors program or permission of instructor.*

COM 1777 Honors Adjunct Computer Science **1 QH**
Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science **4 QH**
Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. *Prereq. Permission of the instructor; may be repeated for credit.*

COM 1810 Topics in Computer Science **4 QH**
Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq. Permission of the instructor.*

Cooperative Education

COP 1135 Professional Development for Journalists **1 QH**
Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self exploration.

COP 1180 Career Decision-Making **4 QH**
Focuses on needs and concerns of students who may be undecided or uncertain about their academic major or career direction. Emphasizes self-assessment, career exploration, decision making, and goal setting. *Prereq. Freshmen or sophomores in any major or permission of instructor.*

COP 1220 Working in the United States **4 QH**
Helps international students compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural issues, the American work ethic, skills development, resume writing, and interviewing techniques. *Prereq. International students prior to first co-op experience or permission of instructors.*

COP 1314 Life/Career Planning **4 QH**
Focuses on career exploration, self-assessment, job-search techniques, and networking. Requires students to prepare a professional resume, to participate in videotaped mock interviews, to research careers, and to investigate graduate and professional schools. *Prereq. Junior or senior standing or permission of instructor.*

COP 1350 Pharmacy Co-op Seminar 1 **1 QH**
Introduces and prepares the pharmacy student for the experiential component of the pharmacy curriculum. Introduces the student to policies and procedures of the Department of Cooperative Education. Provides students with the opportunity to develop the skills necessary to be successful in the preparation, activity, and reflection components of the cooperative education curriculum. Offers students the opportunity to gain an understanding of the various opportunities that are available to them in the profession of pharmacy.

COP 1353 Professional Development for Education **1 QH**
Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and utilizes advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the role of the teachers' union, teacher certification and graduate school, career issues for women, and alternative careers in education.

COP 1370 Introduction to Nursing Career Management **1 QH**
Students will have an opportunity to identify skills; develop job-finding, job-survival, and career management skills; and learn about the nursing co-op program.

COP 1390 Community Service Learning **4 QH**
Provides an introduction to service learning methodology as a way of teaching and learning for lifelong exploration of questions of civic responsibility, multicultural perspectives, societal norms, individual/group empowerment, and values clarification. Students will have the opportunity to explore the relationship of community service to academic study and career decision making.

Criminal Justice

CJ 1101 Administration of Criminal Justice **4 QH**
Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1112 Critical Issues in Criminal Justice **4 QH**
Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process 1 **4 QH**
Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2 **4 QH**
Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq. CJ 1151 and CJ 1252.*

CJ 1201 Criminology **4 QH**
Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law **4 QH**
Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process **4 QH**
Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq. CJ 1251.*

CJ 1253 Introduction to Criminal Courts **4 QH**
Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq. CJ 1251 and CJ 1252.*

CJ 1254 Civil Liability in Criminal Justice **4 QH**
Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq. CJ 1251 and CJ 1252.*

CJ 1255 Introduction to Juvenile Law **4 QH**
Introduces the way society responds to juvenile offenders. Topics studied may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court. *Prereq. HCJ 1252 and junior or senior only.*

CJ 1301 Introduction to Security **4 QH**
Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1302 Theories of Investigation **4 QH**
Examines the commonalities and differences between criminal and non-criminal investigations, using various sources of information, and legal constraints imposed on investigators. Studies how forensics helps investigators in criminal investigations. Discusses interviewing techniques, report writing, and giving testimony.

CJ 1311 White-Collar Crime **4 QH**
Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the interagency and jurisdictional problems and the benefits of cooperation.

CJ 1312 Organized Crime **4 QH**
Examines the myths and realities of what is termed organized crime. Discusses the nature of organized crime and factors that contribute to it, as well as measures taken by society to curb its activities. Addresses the impact of organized crime on American society and its implications, both economic and political. Analyzes the characteristics of organized criminal enterprises and the variety of such groups operating in the United States as well as on the international level.

CJ 1314 Security Management and Supervision **4 QH**
Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq. CJ 1301 or equivalent.*

CJ 1318 Terrorism **4 QH**
Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations **4 QH**
Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security man-

agement concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1401 Police Administration and Management **4 QH**
Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to policing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.

CJ 1411 Police Strategy **4 QH**
Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq. CJ 1401.*

CJ 1424 Seminar in Policing **4 QH**
Specific topic in policing to be announced. *Prereq. CJ 1401, CJ 1411, and junior standing or above.*

CJ 1426 Topics in Policing **4 QH**
Specific topic in policing to be announced. *Prereq. Junior standing or above.*

CJ 1427, CJ 1428, CJ 1429, CJ 1430 Topics in Criminal Justice **4 QH each**
Specific topics in criminal justice to be announced. *Prereq. Middler standing or above.*

CJ 1453 Criminal Justice Research Methods **4 QH**
Examines basic concepts in conducting criminal justice research. Students will become familiar with research techniques that are necessary for systematic analysis of the criminal justice system, offenders' behavior, crime trends, program effectiveness, problem analysis, etc. Requires that students actively pursue such techniques as research interviewing, data coding, and preliminary analysis in and outside of class. *Prereq. MTH 1010 or equivalent.*

CJ 1454 Criminal Justice Statistics **4 QH**
Focuses on the use of statistics with special emphasis on criminal justice applications and the analysis of criminal justice data. Covers basic descriptive statistics, including levels of measurement, measures of central tendency, and measures of variability. Introduces the student to inferential statistics, including the normal curve, sampling error and confidence intervals, hypothesis testing, chi-square, and correlation. *Prereq. HCJ 1453.*

CJ 1511 Survey of Criminal Justice **4 QH**
Focuses upon the fundamentals of criminal trial procedure and the rules of evidence as they apply to the trial of a criminal case. Students are required to read and brief criminal court cases. *Prereq. CJ 1251 and CJ 1252.*

CJ 1512 Seminar in Law and Criminal Justice **4 QH**
Specific topic in the law and criminal justice to be announced. *Prereq. CJ 1251, CJ 1252, and junior or senior standing.*

CJ 1513 Criminal Homicide **4 QH**
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.

CJ 1601 Survey of Correctional Systems **4 QH**
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq. CJ 1201.*

CJ 1612 Juvenile Justice **4 QH**
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq. SOC 1100 and CJ 1201.*

CJ 1613 Probation and Parole **4 QH**
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq. CJ 1601.*

CJ 1615 Crime and Criminal Justice: A Comparative View **4 QH**
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq. CJ 1101, SOC 1100, or equivalent.*

CJ 1616 Women and the Criminal Justice System **4 QH**
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq. Middler standing or above.*

CJ 1618 Victims of Crime **4 QH**
Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1621 Incarceration **4 QH**
Offers in-depth familiarity with key reading in the history and sociology of incarceration. Topics include theories of incarceration; sentence determination; history of our incarceration systems; inmate and staff perspectives on incarceration; and special category inmates (mentally ill, rape victims, death row prisoners). Includes extensive discussion. *Prereq. CJ 1301, middler standing or above, and QPA over B–; or permission of instructor.*

CJ 1622 Alternatives to Incarceration **4 QH**
Explores what is now known about sentencing models used throughout the United States and assesses how well they fulfill societal demands for incapacitation, retribution, and deterrence. Compares substantive differences in various forms of punishment, including intermediate sanctions such as house arrest and electronic monitoring. Examines process issues such as choosing appropriate target populations and decision points where intermediate sanctions may be used. *Prereq. Junior or senior status.*

CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study **4 QH each**

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 **4 QH**
Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq. CHM 1132 and CHM 1138; CHE 1205 taken concurrently.*

CHE 1202 Chemical Engineering Calculations 2 **4 QH**
Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq. CHE 1201.*

CHE 1205 Computation Laboratory **2 QH**
Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq. CHE 1201 taken concurrently.*

CHE 1211 Chemical Engineering Thermodynamics 1 **4 QH**
Covers the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq. CHE 1201 and CHE 1205.*

CHE 1310 Chemical Engineering Thermodynamics 2 **4 QH**
Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq. CHE 1211.*

CHE 1321 Momentum Transport **5 QH**
Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq. CHE 1211 and CHE 1202.*

CHE 1415 Experimental Methods 1 **5 QH**
Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data handling techniques. Lab fee. *Prereq. CHE 1321.*

CHE 1416 Experimental Methods 2 **5 QH**
Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq. CHE 1415.*

CHE 1421 Chemical Engineering Kinetics **4 QH**
Covers fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq. CHE 1310.*

CHE 1431 Heat Transport **5 QH**
Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq. CHE 1321.*

CHE 1441 Separation Processes **5 QH**
Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq. CHE 1431.*

CHE 1450 Chemical Engineering Economics **4 QH**
Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq. ECN 1115.*

CHE 1501 Chemical Process Design 1 **6 QH**
Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq. CHE 1421 and CHE 1441.*

CHE 1502 Chemical Process Design 2 **6 QH**
Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq. CHE 1501.*

CHE 1503 Projects 1 **6 QH**
Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq. Senior standing and permission of department.*

CHE 1504 Projects 2 **6 QH**
Continues the research work begun in CHE 1503. Lab fee. *Prereq. CHE 1503.*

CHE 1511 Mathematical Methods in Chemical Engineering **4 QH**
Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced

mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1512 Chemical Process Control **4 QH**
Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq. Senior standing.*

CHE 1514 Special Topics **4 QH**
Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq. Senior standing.*

CHE 1516 Mass Transfer Operations **4 QH**
Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1519 Polymer Science **4 QH**
Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq. CHE 1421 and CHM 1272; Advanced Chemistry elective.*

CHE 1520 Pollution Control in Chemical Industries **4 QH**
Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1524 Chemical Process Safety **4 QH**
Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1530 Biochemical Engineering Fundamentals **4 QH**
Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course. *Prereq. Permission of department.*

CHE 1796 Honors Project 1 **4 QH**
Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq. Permission of department.*

CHE 1797 Honors Project 2 **4 QH**
Continues CHE 1796. *Prereq. CHE 1796.*

Civil and Environmental Engineering

CIV 1210 Structural Mechanics 1 **4 QH**
Covers statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq. MTH 1223 taken concurrently and PHY 1222.*

CIV 1211 Structural Mechanics 2 **4 QH**
Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq. CIV 1210.*

CIV 1220 Structural Analysis 1 **4 QH**
Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq. CIV 1211.*

CIV 1222 Structural Analysis 2 **4 QH**
Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq. CIV 1220, CIV 1226, and MTH 1230.*

CIV 1226 Structural Analysis and Design Laboratory **2 QH**
Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq. CIV 1220 taken concurrently.*

CIV 1240 Concrete Design 1 **4 QH**
Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq. CIV 1220.*

CIV 1241 Concrete Design 2 **4 QH**
Covers various topics including design of slender columns, foundations, and multistory buildings with one-way and two-way floor systems. *Prereq. CIV 1240.*

CIV 1245 Advanced Structural Design **4 QH**
Continues concrete and steel design. Topics in concrete design include columns with axial loads and bending moments, biaxial bending, and slenderness effects; footings to support walls and columns; prestressed concrete fundamentals. Topics in steel design include bolted and welded connections with tension, shear, combined tension and shear, and eccentric shear; framed beam connections; beam-to-column moment connections; composite columns with combined bending and axial load; composite beams with full

and partial composite action. *Prereq. CIV 1240 and CIV 1250.*

CIV 1250 Steel Design 1 **4 QH**
Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq. CIV 1220 taken concurrently.*

CIV 1251 Steel Design 2 **4 QH**
Discusses topics including design of steel plate girders, composite construction in bridges and buildings, plastic analysis and design, and the design of high-rise buildings subject to lateral loads. *Prereq. CIV 1250.*

CIV 1295 Structural Design Projects **4 QH**
Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq. CIV 1240 and CIV 1250; CIV 1241 or CIV 1251 or CIV 1245; and senior standing. CIV 1222 taken concurrently.*

CIV 1310 Fluid Mechanics **4 QH**
Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq. CIV 1210.*

CIV 1320 Hydraulic Engineering **4 QH**
Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq. CIV 1310.*

CIV 1340 Environmental Engineering 1 **4 QH**
Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq. CHM 1132.*

CIV 1341 Environmental Engineering 2 **4 QH**
Concentrates on unit operations, unit processes, and related fundamental design of physical, chemical, and biological water and wastewater treatment systems. Typical topics include aeration systems, activated sludge, fixed film biological treatment, gas transfer, reaction kinetics, reactor modeling, sedimentation, filtration, and subsurface disposal system design. *Prereq. CIV 1310 and CIV 1340.*

CIV 1350 Environmental and Hydraulics Design Laboratory **4 QH**
Presents lectures and laboratory experiments in the areas of hydraulic and environmental engineering. Laboratory experiments have related design projects which will allow the student to investigate a unit operation or process in some depth. Topic areas covered include several of the following: wastewater neutralization, biological treatment, coagulation, oxygen demand, oxygen transfer, sedimentation, weirs, pumps, ion exchange, carbon absorption, and disinfection. *Prereq. CIV 1320 taken concurrently and CIV 1340.*

CIV 1370 Air Pollution **4 QH**
Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq. Junior standing.*

CIV 1395 Environmental Design Projects **4 QH**
Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq. CIV 1320, CIV 1341, CIV 1350, and senior standing.*

CIV 1410 Soil Mechanics **4 QH**
Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq. CIV 1211. CIV 1310 taken concurrently.*

CIV 1411 Soil Mechanics Laboratory **2 QH**
Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq. CIV 1410 taken concurrently.*

CIV 1420 Foundation Engineering **4 QH**
Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq. CIV 1410.*

CIV 1430 Geotechnology **4 QH**
Introduces the geological sciences as they apply to civil engineering practice. Focuses on the effects of significant geological features on location, design, construction, operation, and maintenance of engineering projects. *Prereq. CIV 1410 taken concurrently.*

CIV 1495 Geotechnical Design Projects **4 QH**
Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq. CIV 1420 and senior standing. CIV 1430 taken concurrently.*

CIV 1510 Materials **4 QH**
Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fun-

damental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq. CHM 1131.*

CIV 1511 Materials Laboratory **2 QH**
Uses standard tests and equipment in the lab to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, and others. *Prereq. CIV 1510 taken concurrently.*

CIV 1530 Transportation Analysis and Planning **4 QH**
Studies the analysis and demand prediction for urban passenger transportation and travel demand forecasting by the traditional four-step method and other methods. Discusses impact assessment, including traffic, environmental, and economic impacts. Topics also include the history of urban transportation and analysis of current policy issues. *Prereq. MTH 1123.*

CIV 1540 Highway Engineering **4 QH**
Presents an overview of highway engineering, including route selection, geometric design, pavement design, drainage, construction, and maintenance. Discusses highway administration, financing, costs, planning and the environmental impact process, and traffic engineering fundamentals for highways. *Prereq. CIV 1620.*

CIV 1550 Construction Management **4 QH**
Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq. Junior standing.*

CIV 1595 Transportation Design Projects **4 QH**
Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq. CIV 1530, CIV 1540, CIV 1630 taken concurrently, CIV 1640, and senior standing.*

CIV 1620 Engineering Measurements **4 QH**
Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq. MTH 1124 and PHY 1221.*

CIV 1621 Engineering Measurements Laboratory **2 QH**
Examines field problems illustrating and applying the lecture material in CIV 1620 with computer applications. *Prereq. CIV 1620 taken concurrently.*

CIV 1630 Civil Engineering Systems **4 QH**
Covers application of system synthesis and optimization techniques: calculus method, linear programming, network analysis, and dynamic programming. *Prereq. MTH 1223.*

CIV 1640 Applied Probability Theory for Civil Engineers **4 QH**
Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq. MTH 1223.*

CIV 1650 Legal Aspects of Civil Engineering **4 QH**
Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq. Junior standing.*

CIV 1665 Professional Issues for Civil Engineers **1 QH**
Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration. *Prereq. Junior standing.*

CIV 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors) **4 QH**
Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

CIV 1797 Independent Study/Research 2 (Honors) **4 QH**
Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq. CIV 1796.*

CIV 1810 Special Topic in Civil Engineering **4 QH**
This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq. Permission of instructor.*

CIV 1820 Special Project in Civil Engineering **4 QH**
Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq. Outstanding academic performance.*

CIV 1821 Special Project in Civil Engineering **2 QH**
For students wishing to spread an independent project over two quarters. Taking CIV 1821 twice is equivalent to taking CIV 1820. Can be taken over two quarters, with students registering for each quarter.

Electrical Engineering

ECE 1171 Electrical Engineering 1 **4 QH**
Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff's laws.

Discusses selected topics that illustrate the variety of applications of electrical engineering, such as AC circuits and electric power, the basics of semiconductor devices with application to transistor amplifier models, transients in circuits with energy storage, digital signals, logic circuits, and some basic concepts of computer operation, specifically number coding, arithmetic operations, and memory circuits. *Prereq. MTH 1125; not open to electrical engineering majors.*

ECE 1178 Digital Electronics for Computer Science Majors **4 QH**
Introduces electronic digital circuits preparing computer science majors for ECE 1382. Starts with the basics of electronic circuit analysis and continues with the principles of MOS and bipolar semiconductors and their applications to logic gate circuits. Discusses logic circuit design supplemented by hardware considerations: level tolerance, power dissipation, gate, and component count. Introduces circuits with RC time constants to explain delays and speed limitations of logic circuits. Describes basic logic array circuits with application to ROM and PROM. *Not open to electrical engineering majors.*

ECE 1215 Circuits 1 **4 QH**
Introduces the basic laws and the basic signal and device models used in the study of linear circuits. Topics include a review of the basic quantities of charge, current, voltage, and power; the basic circuit elements; Kirchhoff's Laws; and Tellegen's Theorem. Covers the concepts of series and parallel connections and equivalent circuits, and the Thevenin and Norton theorems. Introduces three-terminal and dependent source models, with extensive coverage of the ideal operational amplifier model. Discusses various common signal models, including step functions, exponentials, sinusoids, first and second order circuits and the solution of the related differential equations. *Prereq. ECE 1240, MTH 1125, MTH 1225 and PHY 1223. ECE 1241 must be taken concurrently.*

ECE 1226 Discrete Systems Laboratory **1 QH**
Consists of four experiments that are closely integrated with the ECE 1333 course lectures. The first two experiments are concerned with A/D aliasing and quantization, the third with gain and phase-shift, and the fourth with the Discrete-Time Fourier Transform. *ECE 1333 must be taken concurrently.*

ECE 1227 Electromagnetic Fields Laboratory **1 QH**
Supports class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line electrical length measurement; reflection and impedance measurements of dipole antenna; frequency characteristics of antennas and waveguides; antenna mutual coupling; and radiation pattern determination. *ECE 1364 must be taken concurrently.*

ECE 1228 Energy Devices Laboratory **1 QH**
Investigates transformers and DC machines; conducts tests to model the energy device and evaluate its load characteristics, thereby supporting the theory learned in ECE 1370. *ECE 1370 must be taken concurrently.*

ECE 1229 Digital Systems Laboratory **1 QH**
Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as a parallel binary divider or digital calculator. Covers the use of a field programmable gate array for implementing the design. *ECE 1382 must be taken concurrently.*

ECE 1230 VLSI System Design Laboratory **2 QH**
Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Designs can be sent to MOSIS for fabrication. *ECE 1351 must be taken concurrently.*

ECE 1231 Power Systems Laboratory **1 QH**
Applies techniques covered in ECE 1472, addressing topics such as transmission line constants, load flow and short-circuit studies, and transient stability. Includes upgrading the design of a small power system. *ECE 1472 must be taken concurrently.*

ECE 1232 Electric Machines Laboratory **2 QH**
Investigates topics in electromechanical energy conversion employing Faraday's Law Machine Bench. Studies steady-state and transient-state behavior of induction, synchronous, and DC machines. *ECE 1371 must be taken concurrently.*

ECE 1233 Semiconductor Processing Laboratory **2 QH**
Covers fabrication and testing of MOS integrated circuits. Students compare process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Lab work includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated integrated circuits will be electrically characterized. *ECE 1406 must be taken concurrently.*

ECE 1234 Digital Signal Processing Laboratory **2 QH**
Focuses on practical aspects of DSP by programming a digital signal processing chip in its native assembly language. Topics include, but are not limited to, input/output operations via A/D and D/A converters, digital frequency synthesis, computation of discrete time convolution, and design and implementation of both FIR and IIR digital filters. *ECE 1456 must be taken concurrently.*

ECE 1235 Control Systems Laboratory **1 QH**
Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog computer simulation, digital computer control, and use of CAD packages such at MATLAB for analysis and design of control systems. Experiments with PID control emphasize classical methods of feedback compensation, and an experiment with modern techniques of state variable feedback considers digital speed control of a DC motor. *ECE 1420 or ECE 1421 must be taken concurrently.*

ECE 1238 Microprocessor Laboratory **2 QH**
Provides students with the opportunity to practice the theory being learned concurrently in ECE 1383. Consists of four laboratory exercises and a small project executed by groups of three students using a modern single-board computer and associated test and development equipment. Exercises cover topics including memory expansion, memory testing, I/O hardware and I/O drivers, and interrupt driver control. Requires students to integrate

software and hardware to make the system perform some complete task.

ECE 1240 Introduction to Electrical Engineering Laboratory **1 QH**
Provides a hands-on introduction to electronic circuits, devices, and measurement techniques. Students will design, assemble, and test a working electronic system. *Prereq. PHY 1223.*

ECE 1241 Circuits Laboratory **1 QH**
Covers experiments reinforcing basic circuit theory topics such as equivalent circuits, voltage/current divider applications, potentiometers or the Wheatstone bridge, experimental verification of network theorems, operational amplifier behavior, and/or response of RL, RC, and RLC circuits. *Prereq. ECE 1240, MTH 1125, MTH 1225. ECE 1215 must be taken concurrently.*

ECE 1242 Electronics Laboratory 1 **1 QH**
Includes experiments such as characterization of diodes, BJTs, and mosfets. Allows students to design such circuits as multistage amplifiers and photoswitches. *ECE 1341 must be taken concurrently.*

ECE 1243 Electronics Laboratory 2 **1 QH**
Includes experiments using integrated circuit current mirrors, differential amplifiers, frequency response, and feedback. *ECE 1342 must be taken concurrently.*

ECE 1246 Circuits 2 **4 QH**
Presents the unilateral Laplace transform as a technique for solving differential equations with initial conditions which model linear circuit behavior, followed by the introduction of Laplace transform equivalent circuit models. Uses s-domain analysis for the solution of linear circuit problems, including node-voltage and mesh-current methods. Covers several topics connected to the use of network functions including pole/zero plots, frequency response, and a brief treatment of the synthesis of circuits to match given transfer functions. Considers circuits in the sinusoidal steady-state, first introducing phasor representations, then applying phasors to analyze resonance, ideal and linear transformers, and complex power and three-phase systems. *Prereq. ECE 1215.*

ECE 1308 Physical Electronics **4 QH**
Develops elements of solid-state theory including semiconductor statistics and electron transport theory. Uses this knowledge to explore devices commonly used in modern electronic circuits, including p-n junction diodes, ohmic contacts, Schottky barrier diodes, MOS transistors, and bipolar junction transistors. Designed to provide the device background needed for advanced study in the areas of integrated circuit fabrication, VLSI design, and electronic design. *Prereq. ECE 1342.*

ECE 1332 Linear Systems 1 **4 QH**
Discusses continuous systems first from the time domain viewpoint and then from the frequency domain viewpoint. Begins the time domain presentation with a general discussion of systems as a mapping followed by a discussion of time-invariance. Presents linear time-invariant system theory in detail including topics such as convolution, causality, stability, system interconnections, and the system sinusoidal response. Begins the frequency domain presentation with a discussion of the Fourier transform as a basis for the development of the bilateral Laplace transform and the s-plane. Discusses the Fourier and Laplace transforms and their properties, and develops, in terms of these transforms, system aspects such as causality, stability, and the system analysis. Uses the s-plane viewpoint to study the stability of feedback systems and the system gain and phase-shift. *Prereq. ECE 1246.*

ECE 1333 Linear Systems 2 **4 QH**
Begins with an analysis of A/D and D/A conversion, and includes aliasing and ideal D/A conversion. Discusses A/D quantization and continues with the analysis and realization of linear shift-invariant discrete systems. System concepts taught in ECE 1332 provide the basis for development. Presentation includes such topics as convolution, causality, stability, system interconnections, and the system sinusoidal response. This motivates a presentation of Discrete-Time Fourier Series, the Discrete-Time Fourier Transform, and the Z-Transform. Discusses system aspects such as causality, stability, and system analysis in terms of this transform. Lastly, the z-plane analysis of gain and phase-shift is presented. *Prereq. ECE 1332. ECE 1226 must be taken concurrently.*

ECE 1334 Linear Systems 3 **4 QH**
Reviews signals and systems in the frequency domain, applying these concepts to the analysis of various filter types and their applications. Discusses feedback and development of various techniques for the study of stability. Introduces the state variable technique, and uses circuit examples to illustrate and interpret the state equations in the time and frequency domains. *Prereq. ECE 1333.*

ECE 1341 Electronics 1 **4 QH**
Introduces the analysis and design of modern electronic circuits, as well as the operation of the principal semiconductor devices: diodes, field-effect transistors, and bipolar junction transistors. Focuses on using large- and small-signal semiconductor device models to understand the operation of single stage amplifiers and logic gates. *Prereq. ECE 1215. ECE 1242 must be taken concurrently.*

ECE 1342 Electronics 2 **4 QH**
Develops the analysis techniques required to design analog circuit functions, primarily amplifiers. Discusses feedback, frequency response, stability, and compensation. Addresses topics such as biasing, single and compound amplifier stages, feedback amplifiers including impedance, Nyquist's stability criterion, and compensation of feedback amplifiers. *Prereq. ECE 1246 and ECE 1341. ECE 1243 must be taken concurrently.*

ECE 1343 Electronic Design 1 **4 QH**
Develops analysis and design techniques for digital and mixed analog/digital circuits. Recommended for students interested in working in the integrated circuit industry, or with electronic hardware. Examines CMOS and ECL logic families, multivibrators, Schmitt triggers and comparators, pulse generators, sample and hold circuits, and D/A and A/D converters. *Prereq. ECE 1342.*

ECE 1344 Electronic Design 2 **4 QH**
Extends the concepts of Electronics 2 and Electronic Design 1 to a variety of signal processing circuits. Requires students to do at least three major circuit designs, which may include the following: active filters, analog multipliers, saw-tooth generators, sinusoidal oscillators, switching power supplies, and electronic sensors. *Prereq. ECE 1343.*

ECE 1351 Special Topics in IC Design **4 QH**
Offers a structured digital MOS design course in designing, verifying, and fabricating CMOS VLSI integrated circuits. Intro-

duces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RC delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq. ECE 1382. ECE 1230 must be taken concurrently.*

ECE 1355 Communication Systems 1 **4 QH**
Introduces basic concepts of analog and digital communication in additive white Gaussian noise (AWGN) channels. Reviews Fourier transform and Fourier series signal representation and introduces random processes. Examines power spectrum density, analog modulation and demodulation techniques, concepts of information sources and source coding algorithms, principles of optimum receiver design for AWGN channels, correlation and matched filter receivers, and probability of error analysis for binary and M-ary signals. *Prereq. MTH 1384 and ECE 1333.*

ECE 1363 Electromagnetic Fields 1 **4 QH**
Develops the fundamental equations of electromagnetics and presents applications. Introduces the mathematics necessary for electromagnetics: complex vector phasors and vector calculus. Defines the electromagnetic field with the Lorentz force equation. Presents and applies Coulomb's and Biot-Savart's laws. Explains the macroscopic constitutive relations. Formulates Maxwell's equations in both integral and differential form. Develops Poynting's theorem. Presents the principles for the operation of generators and motors. Derives the wave equation and studies the uniform plane wave solution in both time and frequency domain. Concludes with the reflection and transmission of plane waves. *Prereq. MTH 1223, MTH 1225, and PHY 1223.*

ECE 1364 Electromagnetic Fields 2 **4 QH**
Studies electrodynamic applications of electromagnetic field theory: lossless transmission lines, waveguides, optical fibers, and antennas. Develops transmission line theory by use of distributed circuit elements and introduces the TEM waves. Obtains solutions analytically and also graphically using the Smith Chart. Seeks TM and TE solutions for parallel-plate waveguides and general rectangular metal waveguides. Examines optical fibers after a study of uniform plane wave refraction. Investigates the radiation properties of electric dipoles and studies the enhancement of directivity using phased arrays. *Prereq. ECE 1363. ECE 1227 must be taken concurrently.*

ECE 1366 Computational Electromagnetics **4 QH**
Presents numerical and computational approaches to electromagnetic field problems, as well as design problems. Gives students the opportunity to use software environments such as Matlab to implement the various algorithms for solution and to present graphical results. Begins with the finite difference approach for solving the major partial differential equations of electromagnetics: Laplace's equation, the diffusion equation, and the wave equation. Introduces integral equations as foundation for solving problems with the method of moments. Makes applications to the linear antenna and to antenna arrays. Presents computational models for solving design problems so that students may carry out individual design studies. *Prereq. ECE 1364.*

ECE 1370 Electric Energy Devices **4 QH**
Reviews phasor diagrams and three-phase circuits, and presents magnetic aspects including magnetic circuits, energy storage, and permanent magnets. Includes other topics such as elements of transformers, principles of electromechanical energy conversion, and steady-state theory of induction, synchronous, and DC machines. *Prereq. 1246, ECE 1364. ECE 1228 must be taken concurrently.*

ECE 1371 Electric Drives and Motion Systems **4 QH**
Continues ECE 1370. Presents steady-state theory and performance of induction, synchronous, and DC machines. Investigates transients and dynamics of AC and DC machines. Introduces power semiconductor controlled drives. *Prereq. ECE 1370. ECE 1232 must be taken concurrently.*

ECE 1379 Analysis of Electrical Transients **4 QH**
Focuses on transient behavior where tools of linear, time-invariant analysis are inoperative. Draws examples from the power system and from computer interconnections. Studies topics and methods of broad interest in all of electrical engineering, exploring events such as communication over long and short transmission lines, circuit breaker action, transient recovery voltage, restrike, transient inrush current, geomagnetically induced currents, ferroresonance and capacitor flashover using piecewise-linear analysis techniques. Uses Matlab and Excel to attack real problems. Examines the real-world non-LTI behavior of transformers, transmission lines, circuit breakers, surge arresters, and lightning. Gives students the opportunity to do an analysis project, in which they model mathematically some transient event which they create in the lab or extract from the literature and then evaluate how well their mathematical model describes reality. *Prereq. ECE 1333 and ECE 1342.*

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture **4 QH**
Presents the visible architecture of a modern computer. Uses assembly language programming to develop a foundation on the hardware which executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq. GE 1101 or equivalent.*

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits **4 QH**
Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using SSI and MSI chips to develop facility in the design and testing of functional digital circuits. Proof of the circuit will be done using the CAD tools. *Prereq. ECE 1381. ECE 1229 must be taken concurrently.*

ECE 1383 Computer Engineering 3: Microprocessor-Based Design **4 QH**
Provides an introduction to both hardware and software issues in interfacing microprocessors to their local and outside worlds. Includes lab and lecture components to develop both analytical

understanding and design skills. Examines the following hardware items: bus characteristics, timing and protocols; memory organization; memory-mapped I/O; and interrupts. Studies complementary software topics including polling versus interrupt driven I/O and exception processing. *Prereq. ECE 1382. ECE 1238 must be taken concurrently.*

ECE 1384 Computer Engineering 4: Computer Organization and Design **4 QH**
Provides a coherent, structured overview of the current state of Computer Organization and Design. Studies the strategies for attaining high performance using the instruction set of a real architecture. Focuses on the forces that drive cost/performance decisions to achieve successful designs. Highlights design principles based on the interactions of hardware and software. Topics include performance metrics, machine language, processor data path and control path designs, pipelining, memory hierarchies, I/O devices and interfacing techniques, and parallel processing. Provides a deeper understanding of design and performance issues in laboratory exercises using software simulators. *Prereq. ECE 1383.*

ECE 1385 Computer Engineering 5: Introduction to Robotics **4 QH**
Teams two students together to design and implement a small mobile robot system to complete a specific task. Students compete their robots against robots built by other teams at the end of the course. Develops students' design capabilities of microprocessor controlled systems with input from sensory devices and output actuators. Topics include actuators, sensors, and system modeling. *Prereq. ECE 1333 and ECE 1383.*

ECE 1386 Computer Engineering 6: Structure of Large-Scale Computer Systems **4 QH**
Studies the C++ programming language with an overview of object-oriented design in the first part of the course. A C++ tutorial will be provided. Focuses on high-performance computer architecture in the second part of the course. Includes microprocessor design, multiprocessors, memory coherency and consistency, and the hardware-software interaction. *Prereq. ECE 1384.*

ECE 1390 Senior Project Laboratory 1 **2 QH**
Allows students to work with a faculty adviser on a term project, either experimental or theoretical. *Prereq. Permission of department.*

ECE 1391 Senior Project Laboratory 2 **2 QH**
Continues the project started in ECE 1390 or it may be a new project. *Prereq. Permission of department.*

ECE 1400 Special Topics **4 QH**
Covers various topics from term to term depending on the interests of the department and the students. *Prereq. Permission of department.*

ECE 1406 Integrated Circuit Fabrication **4 QH**
Provides an overview of integrated circuit fabrication from the viewpoint of the process engineer. Focuses on the physics, chemistry, and technology of integrated circuit fabrication. Uses the industry-standard process simulator SUPREM-IV to supplement analytical process models. Expands on the semiconductor device background learned in ECE 1308. Reviews MOS operation and device models in conjunction with testing of the integrated circuit fabricated in the lab (ECE 1233). Concentrates on silicon IC technology, but also discusses other material systems and microstructures including GaAs and microsensors. *Prereq. ECE 1308. ECE 1233 must be taken concurrently.*

ECE 1421 Control Systems **4 QH**
Introduces the analysis and design of classical control systems and comprises closely coupled lectures and laboratory experiments. Examines control system objectives, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, and stability of feedback systems. Also addresses compensator design based on root-locus and frequency response, and modern control system design using state variable feedback. *Prereq. ECE 1334. ECE 1235 must be taken concurrently.*

ECE 1455 Communication Systems 2 **4 QH**
Presents the fundamentals of state-of-the-art digital communication systems and coding techniques. Covers digital data transmission through bandlimited Gaussian channels, equalization, digital carrier modulation schemes, optimal receiver design and performance analysis, capacity and coding for reliable communication, block and convolutional codes and their decoding, direct sequence and frequency hopped spread spectrum systems. *Prereq. ECE 1355.*

ECE 1456 Digital Signal Processing **4 QH**
Introduces concepts in modern signal processing. Topics include review of discrete time signals and systems, discrete Fourier transform, realizations structures for digital filters, FIR filter design, IIR filter design, fast Fourier transforms, and applications to fast convolution. *Prereq. ECE 1333. ECE 1234 must be taken concurrently.*

ECE 1458 Communication Networks **4 QH**
Provides students with a working knowledge of design principles and standardized protocols used in the communication networks. Employs the international OSI (Open System Interconnection) model to describe the general layering of network architecture. Also analyzes other architectures, such as those of the Internet and the Local Area Networks (LANs) based on IEEE standards. Discusses design principles, including switching and multiplexing techniques as well as network management. Addresses physical link from the viewpoint of signal propagation, synchronization, framing, and error control. Studies data link protocols, such as Alternating Bit Protocol, Go-Back-N, and Selective Repeat Protocol. The study of Local and Metropolitan Area Networks includes such topics as the Aloha Protocol and Carrier Sense Multiple Access, Ethernet, Token-Ring and Token-Bus Networks, and the FDDI (Fiber Distributed Data Interface) and DQDB (Dual Queue Data Bus) protocols. Studies routing and congestion control on the network layer level. Introduces emerging technologies such as Broadband ISDN (Integrated Service Data Network). *Prereq. MTH 1384 and ECE 1355.*

ECE 1463 Antennas **4 QH**
Introduces the fundamental principles of antenna theory. Applies these principles to the design and analysis of practical antennas. Covers fundamental antenna parameters, radiation integrals and auxiliary potential functions, linear and loop antennas, antenna arrays, broadband dipoles and impedance matching techniques, traveling wave and broadband antennas, and frequency independent, aperture and reflector antennas. *Prereq. ECE 1364.*

ECE 1464 Microwave Networks **4 QH**
Focuses on advanced analytical, graphical, and matrix analyses of transmission lines and microwave networks. Covers analyses of lossy and lossless transmission lines, electrical scattering S-parameters, ferrite networks, microwave absorbers, and matrix representation of multiple connected networks. *Prereq. ECE 1364.*

ECE 1466 Modern Optics **4 QH**
Presents the basic optical concepts necessary for an understanding of quantum electronic devices. Analyzes the simple Lorentzian model of the interaction between electromagnetic waves and optical materials, modified to include necessary quantum concepts. Topics include propagation of electromagnetic waves in isotropic and non-isotropic media (crystal optics); reflection and refraction, polarization and double refraction; optical resonance and stability criteria; Gaussian beam propagation; systems with gain; coherent and non-coherent optical sources; and detection of optical signals. Considers specific devices including resonators, amplifiers, and oscillators; modulators and switches; and optical detectors. *Prereq. ECE 1364.*

ECE 1471 Elements of Power Systems **4 QH**
Introduces electric power systems. Examines steady-state balanced three-phase systems, transmission line constants and system modeling, transmission line equations and line power limitations, and three-phase transformers. Introduces symmetrical components and also includes a high voltage transmission line design. *Prereq. ECE 1246 and ECE 1364.*

ECE 1472 Power System Analysis **4 QH**
Presents basic methods for the analysis of power systems, including load flow, symmetrical short circuits, symmetrical component theory and unsymmetrical faults, and elements of power system protection, control, and transient stability. Uses power system software for some system studies. *Prereq. ECE 1471. ECE 1231 must be taken concurrently.*

ECE 1474 Power Electronics **4 QH**
Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and resonant converters. Illustrates modeling, analysis and control techniques on numerous application examples. Covers design problems including analysis and sizing of passive components (inductors and capacitors) in high-frequency DC/DC switching converters. *Prereq. ECE 1332 and ECE 1342.*

ECE 1486 Numerical Methods and Computer Applications **4 QH**
Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; least squares; numerical solution of ordinary and partial differential equations using a programming environment such as MATLAB. Chooses representative problems for solution on a digital computer. *Prereq. MTH 1225 and GE 1102.*

ECE 1501 Capstone Design 1 **2 QH**
Requires students to select a project requiring design and implementation of an electrical, electronic, and/or software system, form a team to carry out the project, and submit a detailed proposal for the work. *Prereq. ECE 1333, ECE 1342, ECE 1355, ECE 1364, ECE 1382, and senior standing.*

ECE 1502 Capstone Design 2 **4 QH**
Requires students to design and implement the project proposed in ECE 1501. Expects students to evaluate progress with interim milestone reports and to present the final design project with written and oral reports. *Prereq. ECE 1501 taken in previous quarter.*

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1001 Introduction to Engineering **1 QH**
Presents an introduction to the various disciplines of engineering and strategies for success both in the classroom and in practice within the profession.

GE 1002 Introduction to Engineering Cooperative Education **1 QH**
Introduces engineering freshmen students to the cooperative education curriculum and assists them through self-assessment in relation to the engineering profession. Uses the Myers Briggs Type Indicator and Super's Work Values Inventory, to provide students with an introduction to how personalities, work styles, personal values and interests relate to work performances and career choices. Students examine the engineering profession, develop resume writing, interviewing, and time management skills, and are introduced to professional ethics.

GE 1101 Engineering Problem Solving and Computation **4 QH**
Uses developing and structuring approaches to solve engineering problems. Draws applications from a variety of engineering disciplines which serve as a tool for introducing students to engineering analysis and design. Includes the design of problem-solving algorithms along with an introduction to the "C" programming language.

GE 1102 Engineering Problem Solving with Application Software **2 QH**
Develops fundamental problem solving skills essential to all engineering disciplines. Introduces students to spreadsheet and math application packages and their use in solving engineering problems. Topics include data reduction and transformation, visualization of data and functions, problem structuring, and matrix applications. Examples stress real-life engineering analysis and design as a tool for introducing students to the engineering profession.

GE 1103 Engineering Design **4 QH**
Presents the engineering design process using case studies from a variety of engineering disciplines. Topics include problem formulation and specification, creativity, evaluation tools, patents, product liability, ergonomics, systems design, failure analysis, hazard prevention, manufacturing, ethics in engineering, and presentation techniques. Presents engineering graphics, focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Students will develop an original design solution to a technical problem as a term project and use CAD software extensively.

GE 1701 Engineering Problem Solving and Computation (Honors) **4 QH**
Honors equivalent of GE 1101.

GE 1702 Engineering Problem Solving with Application Software (Honors) 2 QH
Honors equivalent of GE 1102.

GE 1703 Engineering Design (Honors) 4 QH
Honors equivalent of GE 1103.

Mechanical, Industrial, and Manufacturing Engineering

MIM 1212 Probabilistic Analysis for Engineers 4 QH
Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, moment generating functions, sampling distribution, and point and interval estimations. *Prereq. Integral and Differential Calculus.*

MIM 1215 Engineering Economy 4 QH
Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies effects of taxes on investment analysis. Utilizes mathematical and graphical models to evaluate candidate solutions to design alternatives.

MIM 1240 Materials Science 5 QH
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq. CHM 1132.*

MIM 1241 Materials Science 4 QH
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. *Non–ME Students.*

MIM 1245 Materials Science 4 QH
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors, and junctions. *Prereq. CHM 1132.*

MIM 1250 Engineering Mechanics 5 QH
Examines vector representation of force and moment, equivalent force systems, centroids and centers of gravity, and distributed forces. Examines free body diagrams and equations of equilibrium, applications to trusses, pin connected frames, and beams elementary concepts of friction. Examines fundamentals of dynamics, kinematics of particles, and kinetics of particles using force, mass, and acceleration.

MIM 1268 Dynamics 1 5 QH
Develops problem-solving ability in the fundamentals of dynamics. Topics include kinematics of particles, kinematics of rigid bodies, and mass moments of inertia. Examines kinetics of particles and rigid bodies using force, mass, and acceleration. *Prereq. MIM 1250.*

MIM 1270 Thermodynamics 4 QH
Studies the systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems on the ideal gas. Introduces the Second Law of Thermodynamics and the property of entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq. MTH 1223; not open to mechanical engineering majors.*

MIM 1280 Thermodynamics 1 5 QH
Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property of entropy. Emphasizes the macroscopic consequences of irreversibility and the limitation placed, through the Second Law, on the behavior of engineering systems. Available energy and its application in thermodynamics is investigated. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq. MTH 1223 taken concurrently.*

MIM 1300 Measurements and Analysis 5 QH
Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

MIM 1312 Statistics 4 QH
Examines the definition of a statistic and reviews the distributions and approximations of random variables. Introduces hypothesis testing, including tests for means, variances, and proportion. Covers nonparametric methods, analysis of variance, and simple linear regression. *Prereq. MIM 1300.*

MIM 1315 Principles of Computation and Programming 1 4 QH
Reviews algorithms, computers, and programming; machine language programming (instruction, execution, and addressing techniques); coding and representation of data; program debugging and verification. Surveys machines, devices, and languages. *Prereq. Higher-level language.*

MIM 1320 Work Design 4 QH
Covers the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement synthetic standards and work sampling. Includes a project in which principles of work design must be applied.

MIM 1325 Operations Research 1 4 QH
Covers deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq. MTH 1223.*

MIM 1354 Strength of Materials **4 QH**
Explores the concept of stress and strain, state of stress and strain at a point, and stress-strain relations and material properties. Investigates moment of inertia of areas and stress properties. Investigates moment of inertia of areas, stress and deformation of simple members under axial and torsional loads, and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Non–ME Students.*

MIM 1355 Strength of Materials 1 **5 QH**
Explores the concept of stress and strain, state of stress and strain at a point, and stress-strain relations and material properties. Investigates moment of inertia of areas, stress and deformation of simple members under axial and torsional loads, and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq. MIM 1250.*

MIM 1356 Strength of Materials 2 **4 QH**
Covers asymmetrical bending, analysis of determinate and indeterminate beams by various methods, and buckling of columns. *Prereq. MIM 1355.*

MIM 1360 Dynamics **4 QH**
Development of problem-solving ability in dynamics. Examines kinematics of rigid bodies, including rotating reference frames; kinetics of rigid bodies using force, moment, mass moment of inertia, and acceleration. Examines kinetics of particles and rigid bodies using work and energy, and using impulse and momentum. *Prereq. MIM 1250.*

MIM 1364 Mechanics for Electrical Engineers **4 QH**
Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work, and energy; and impulse and momentum. *Prereq. PHY 1222.*

MIM 1366 Dynamics for Civil Engineers **4 QH**
Covers kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq. CIV 1210.*

MIM 1368 Dynamics 2 **4 QH**
Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq. MIM 1268.*

MIM 1370 Heat Transfer **5 QH**
Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq. ME 1280, MIM 1375, and MTH 1226.*

MIM 1374 Fluid Mechanics **4 QH**
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy), Newton's law of viscosity, dimensional analysis, integral forms of the basic laws (conservation of mass, momentum, and energy), pipe flow analysis, and differential formulation of basic laws with Laminar flow analyses. *Non–ME Students.*

MIM 1375 Fluid Mechanics **5 QH**
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with Laminar flow analyses. Includes labs and a computer project. *Prereq. MIM 1280 and MTH 1225.*

MIM 1380 Thermodynamics 2 **5 QH**
Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles, including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbocharging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq. MIM 1280.*

MIM 1400 Mechanical Engineering Computation and Interpretation **4 QH**
Studies the application of software tools to the solution of mechanical engineering problems. Techniques for purposes of understanding software, including finite element and finite difference development, will be treated as needed. Software for advanced strength analysis, fluid dynamics, and heat transfer problems will be included. Special emphasis on interpretation of results will be given throughout the course.

MIM 1410 Digital Simulation Techniques **4 QH**
Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq. Higher-level language and MIM 1312.*

MIM 1420 Management Information Systems **4 QH**
Examines the design and implementation of computer-based information systems. Topics include the value of information, tools of system analysis and design, the impact of computer-based information systems on organizations and society, rudimentary computer architecture, input devices, data organization and storage, system configuration, communications, and output/display devices.

MIM 1422 Systems **4 QH**
Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models, transfer functions and block diagrams, system components and the method of analogies, accuracy, and stability. *Prereq. MTH 1230.*

MIM 1425 Operations Research 2 **4 QH**
Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq. MIM 1312.*

MIM 1430 Manufacturing Systems and Techniques **5 QH**
Focuses on manufacturing and design and their impact on each other. Covers the basics of manufacturing systems and techniques. Examines manufacturing and design; manufacturing engineering, planning, and control; and automation in manufacturing. Topics include manufacturing systems, manufacturing processes, rapid prototyping, design for assembly, design for manufactura-

bility, concurrent engineering, CAD/CAM systems, bill of materials, group technology, mechanical tolerancing, quality control, just-in-time philosophy, NC part programming, programmable logic controllers, flexible manufacturing systems, and CIM. Use of a manufacturing lab and related experiments are required for students to gain hands-on experience.

MIM 1440 Mechanical Behavior of Materials **4 QH**
Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq. MIM 1240.*

MIM 1445 Materials Processing **4 QH**
Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq. MIM 1240.*

MIM 1450 Mechanical Design **5 QH**
Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, and simulation; and optimization of mechanical systems. *Prereq. MIM 1356.*

MIM 1455 Mechanical Vibrations **5 QH**
Studies free and forced vibrations of undamped and damped one-degree-of-freedom systems. Includes rotational unbalance, support motion, vibration isolation, vibration measuring equipment, nonviscous damping, general periodic excitation, and nonperiodic excitation using numerical methods. Examines free and forced vibration of multi-degree-of-freedom systems, the vibration absorber, coordinate coupling, and normal modes of vibration. *Prereq. MIM 1360.*

MIM 1475 Thermal Design **5 QH**
Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq. MIM 1370.*

MIM 1480 Thermodynamics 3 **5 QH**
Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts, reacting gas mixtures and combustion, and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change, and normal shock waves. Includes a lab. *Prereq. MIM 1380.*

MIM 1501 Design Project 1 **5 QH**
Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq. MIM 1450 and MIM 1475.*

MIM 1502 Design Project 2 **5 QH**
Continues the project started in MIM 1501. Students remain in the same group and under the direction of the same faculty advisers as in MIM 1501. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq. MIM 1501.*

MIM 1505 Independent Study in Industrial Engineering **4 QH**
Allows independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of the quarter.

MIM 1506 Special Topics **4 QH**
When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq. Permission of the department.*

MIM 1507 Mechanical Engineering Project 1 **4 QH**
Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Senior standing.*

MIM 1508 Mechanical Engineering Project 2 **4 QH**
Continues MIM 1507. *Prereq. MIM 1507.*

MIM 1510 Production and Inventory Control **4 QH**
Explores design of basic inventory models and inventory management systems, single-stage and multistage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses and consideration of job shop scheduling and dispatching problems. *Prereq. MIM 1312 and MIM 1325.*

MIM 1512 Facilities Design **4 QH**
Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq. MIM 1325.*

MIM 1514 Material Handling System Design **4 QH**
Discusses the design and analysis of large material-handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and system acquisitions. *Prereq. MIM 1325.*

MIM 1516 Quality Assurance **4 QH**
Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq. MIM 1312.*

MIM 1518 Expert Systems **4 QH**
Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, machine learning techniques, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq. GE 1100, MIM 1212, MIM 1315, or permission of instructor.*

MIM 1520 Human Considerations in Engineering Design **4 QH**
Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

MIM 1522 Human-Machine Systems **4 QH**
Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

MIM 1528 Design Project **4 QH**
Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq. Senior standing.*

MIM 1530 Manufacturing Automation **4 QH**
Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq. MIM 1315 or permission of instructor.*

MIM 1540 Engineering Materials **4 QH**
Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq. MIM 1240.*

MIM 1550 Advanced Strength and Applied Elasticity **4 QH**
Covers analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq. MIM 1356.*

MIM 1555 System Analysis and Control **4 QH**
Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq. MIM 1360.*

MIM 1560 Computer-Aided Design **4 QH**
Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques of design and manufacture. Requires a design project. *Prereq. GE 1103 and MIM 1356.*

MIM 1561 Advanced Computer-Aided Design **4 QH**
Covers advanced applications of interactive graphics concepts to different engineering tasks, including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq. MIM 1560.*

MIM 1570 Internal Combustion Engines **4 QH**
Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq. MIM 1480.*

MIM 1575 Fluid Mechanics 2 **4 QH**
Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and the Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq. MIM 1375.*

MIM 1576 Gas Dynamics **4 QH**
Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows, including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq. MIM 1375.*

MIM 1750 Engineering Mechanics (Honors) **5 QH**
Examines vector representation of force and moment, equivalent force systems, centroids and centers of gravity, and distributed forces. Examines free body diagrams and equations of equilibrium, applications to trusses, pin connected frames, and beams elementary concepts of friction. Examines fundamentals of dynamics, kinematics of particles, and kinetics of particles using force, mass, and acceleration. *Prereq. MIM 1250.*

MIM 1755 Strength of Materials 1 (Honors) **5 QH**
Honors equivalent of MIM 1355. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq. MIM 1250.*

MIM 1770 Heat Transfer (Honors) **5 QH**
Honors equivalent of MIM 1370. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq. MIM 1280, MIM 1375, and MTH 1226.*

MIM 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors

office for dissemination to the honors membership. Students may enroll in MIM 1777 an unlimited number of times, as it can be an adjunct to any mechanical engineering course.

MIM 1780 Thermodynamics 1 (Honors) **5 QH**
Honors equivalent of MIM 1280. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq. MTH 1223 taken concurrently.*

MIM 1796 Undergraduate Honors Thesis 1 **4 QH**
Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

MIM 1797 Undergraduate Honors Thesis 2 **4 QH**
Continues MIM 1796. *Prereq. MIM 1796.*

Engineering Technology

Computer Technology

CT 1150 Computer Organization **4 QH**
Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocesser programming, and input/output processing.

CT 1311 Programming with C++ Language **4 QH**
Presents C++, which is used to introduce students to Object-Oriented Programming (OOP). Covers functions, arrays, pointers, classes and abstraction, operating overloading, inheritance, virtual functions, polymorphism, and templates. A project is required. *Prereq. GET 1100.*

CT 1330 Data Structures **4 QH**
Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq. CT 1311.*

CT 1335 Numerical Methods **4 QH**
Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq. CT 1311 and MTH 1195.*

CT 1340 Software Engineering Design **4 QH**
Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq. CT 1330.*

CT 1345 Assembly Language **4 QH**
Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq. CT 1311 and CT 1150.*

CT 1346 Assembly Language Lab **1 QH**
Teaches how to program in 68000 assembly language and presents arithmetics operations, logic operations, and use of input/output functions available in the 68000 as part of a line editor experiment; control of a single-digit hexadecimal display output; use of hardware and software timers to generate a digital clock display; and other experiments that are consistent with the ones described above. *Prereq. CT 1311.*

CT 1348 LISP **4 QH**
Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq. CT 1330.*

CT 1351 Advanced Computer Organization **4 QH**
Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq. CT 1356 and CT 1375.*

CT 1355 Microprocessor Peripheral Hardware **4 QH**
Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq. CT 1374.*

CT 1356 Complex Peripheral Hardware **4 QH**
Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq. CT 1355.*

CT 1360 Industry Software **4 QH**
Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq. CT 1381.*

CT 1363 Concurrent Programming **4 QH**
Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq. CT 1330 and CT 1340.*

CT 1365 Industry Hardware **4 QH**
Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq. CT 1356.*

CT 1368 Semiconductor Logic **4 QH**
Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and to convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq. EET 1152.*

CT 1369 Computer Logic **4 QH**
Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq. CT 1368.*

CT 1370 Computer Laboratory 1 **2 QH**
Offers experiments to investigate and test the behavior of basic digital gates and to design and implement simple logic circuits using Boolean theorems. Topics include voltage, current resistance, logic gates, logic functions, gate outputs, fan-in, fan-out, square-wave generation, and operational amplifiers. *Prereq. EET 1311.*

CT 1371 Computer Laboratory 2 **2 QH**
Provides experiments to design and implement building blocks of a computer system. Topics include counters, shift registers, arithmetic and logic units, control units, computer memory, and A/D and D/A converters. *Prereq. CT 1369 and CT 1374.*

CT 1372 Computer Laboratory 3 **2 QH**
Offers experiments that reinforce the concepts of microprocessor interfacing learned during classroom lectures. Topics include input/output ports, displays, interrupts, generating time intervals, interfacing mechanical switches, asynchronous communication, and memory systems. *Prereq. CT 1345 and CT 1374.*

CT 1374 Introduction to CPU Hardware **4 QH**
Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bust concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq. CT 1345 and CT 1368.*

CT 1375 CPU Architecture **4 QH**
Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq. CT 1374.*

CT 1377 VLSI Design **4 QH**
Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq. CT 1369.*

CT 1380 Data Communication Methods **4 QH**
Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq. CT 1375.*

CT 1381 Operating Systems **4 QH**
Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq. CT 1330.*

CT 1383 Databases **4 QH**
Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq. CT 1330.*

CT 1387 Bit-Slice Microcomputers **4 QH**
Demonstrates the basic design ground rules common to the bit-slice CPU style of hardware design. *Prereq. CT 1355.*

CT 1389 Single-Chip Microprocessors **4 QH**
Explains the hardware limitations of a single-chip system. When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. *Prereq. CT 1374.*

CT 1390 Special Problems in Computer Technology **4 QH**
Students perform theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

CT 1391 Topics in Computer Technology **4 QH**
Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq. Permission of the instructor.*

CT 1393 UNIX Operating System **4 QH**
Surveys advanced topics related to UNIX and its filing system. Studies the advance features in the editor and system utilities as well as the general theory of an operating system with emphasis on the relationship between the kernal, filing system, and standard libraries. Discusses low level I/O, forks, pipes, and signaling and introduces the use of nroff, sed, lint, cc, lex, and yacc. *Prereq. CT 1330.*

CT 1394 Object-Oriented Programming **4 QH**
Examines the methodologies currently used in object-oriented programming languages, drawing on case studies of Small Talk, Flavors, CLOS, and C++. Other topics include G-Base, an object-oriented database system, and the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq. CT 1330.*

CT 1395 Computer Security **4 QH**
Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq. CT 1380.*

CT 1396 PROLOG: An Introduction to Artificial Intelligence **4 QH**
Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq. CT 1330.*

CT 1397 Advanced UNIX Programming **4 QH**
Studies the design and development of C application programs that interface with the UNIX operating system kernel. Enables C programmers to interact with the UNIX operating system through system calls and library routines. Topics include system programming tools, fundamental concepts, file creation and access, signal and signals handling, multitasking, file and terminal I/O, process creation and programming execution, and forms of interprocess communication and synchronization (pipes, message queues, semaphores, and shared memory). Students use the University's computer facilities to prepare course assignments. *Prereq. CT 1393.*

CT 1480 Local Area Networks 1 **4 QH**
Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq. CT 1380. Not open to students who have taken CT 1379.*

CT 1481 Local Area Networks 2 **4 QH**
Examines the upper four layers of the ISO reference model; transport, session, presentation and application layers. Topics include TCP/IP, DECNET, NETBIOS, FTP, TELNET, and E-MAIL. *Prereq. CT 4480 or CT 1480.*

CT 1492 Independent Study in Computer Technology **4 QH**
Independent study of advanced computer technology projects for students usually in the upper junior or senior year having high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq. Permission of advisor and project supervisor.*

Electrical Engineering Technology

EET 1151 Circuit Analysis 1 **4 QH**
Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq. MTH 1193 or PHY 1193.*

EET 1152 Circuit Analysis 2 **4 QH**
Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. *Prereq. EET 1151.*

EET 1310 Electrical Measurements **4 QH**
Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq. EET 1353.*

EET 1311 Digital Electronics 1 **4 QH**
Introduces elements of digital electronics, starting with the binary number system and proceeding to Boolean algebra and DeMorgan's theorems. Discusses combinatorial logic in detail and the basic circuitry to realize AND, OR, and NOT devices. Gives an introduction to sequential logic and the bistable devices required to realize it. Proceeds to the basic sequential circuits such as counters and shift registers. Includes the analysis and design of both combinatorial and sequential circuits. *Prereq. EET 1152.*

EET 1312 Analog Electronics 1 **4 QH**
Reviews the theory of linear circuits and extends it to simple non-linear circuits of both the two-terminal variety and the three-terminal variety. Considers the solid-state theory of the PN diode as an example of the two-terminal non-linear device, and the NPN, PNP, and field-effect devices as examples of the three terminal non-linear elements. Includes light-sensitive and heat-sensitive solid-state devices. Considers the problem of selecting an operating point for a non-linear device, and the corresponding practical methods of providing the required biases. Introduces the small-signal linear model for the non-linear device in the vicinity of the operating point. *Prereq. EET 1152, PHY 1193.*

EET 1313 Analog Electronics 2 **4 QH**
Reviews small-signal models for three-terminal devices and discusses frequency response of such models, including the Bode asymptotic approximation to frequency response. Also reviews Mason's signal flow graph concepts for determining transfer functions. Examines operational amplifiers including their ideal behavior and the limitations introduced by finite input and output impedances, finite gain, and finite bandwidth. Explores feedback and stability problems that can occur when using operational amplifiers. Studies applications of feedback to oscillators and active filters. *Prereq. EET 1312.*

EET 1314 Digital Electronics 2 **4 QH**
Reviews the basic concept of Boolean algebra, combinatorial logic, and binary arithmetic, and extends them to the design of coding systems such as binary, binary-coded decimal, Gray code, seven-segment displays, and multiplexers. Introduces flip-flops and sequential logic circuits such as ripple counters, synchronous counters, ring counters and Johnson counters, shift registers, solid-state memory devices, and the 555 timer. Emphasizes design of digital systems using the available microelectronic gates, primarily in the TTL series. *Prereq. EET 1313.*

EET 1315 Digital Electronics 3 **4 QH**
Examines the physical devices that are used to realize digital circuits, as a complement to the previous treatment of idealized mathematical models. Introduces the concepts of rise-time, fall-time, set-up time, hold time, delay time, and the maximum frequency of a clock. Discusses the presently available logic families such as TTL, CMOS, and EC, compares them, and considers the problems of interconnecting them. Introduces memory elements and field-programmable logic elements. Presents interfacing devices such as analog-to-digital and digital-to-analog converters. *Prereq. EET 1314.*

EET 1317 Principles of Communication Systems 1 **4 QH**
Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq. EET 1313.*

EET 1318 Principles of Communication Systems 2 **4 QH**
Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq. EET 1317.*

EET 1319 Principles of Communication Systems 3 **4 QH**
Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq. EET 1318.*

EET 1320 Electricity and Electronics 1 **4 QH**
Introduces circuit analysis, resistive networks, periodic excitation function, steady state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq. MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.*

EET 1321 Electricity and Electronics 2 **4 QH**
Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq. EET 1320.*

EET 1323 Electronic Laboratory **2 QH**
Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq. EET 1311.*

EET 1324 Circuits Laboratory 1 **2 QH**
Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq. EET 1151.*

EET 1325 Circuits Laboratory 2 **2 QH**
Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 1124.*

EET 1327 Advanced Electronics Laboratory 1 **2 QH**
Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq. EET 1323.*

EET 1328 Advanced Electronics Laboratory 2 **2 QH**
Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 1327.*

EET 1329 Advanced Electronics Laboratory 3 **2 QH**
Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phaselocked loop, as well as a series of microwave experiments and digital experiments. *Prereq. EET 1328.*

EET 1330 Energy Conversion **4 QH**
Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 1152 and MTH 1195.*

EET 1337 Distributed Systems **4 QH**
Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq. MTH 1195 and PHY 1193.*

EET 1353 Circuits Analysis 3 **4 QH**
Introduces three-phase circuits and three-phase, single-phase systems. Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 1152.*

EET 1354 Circuits Analysis 4 **4 QH**
Explores the Bode asymptotic frequency response approximation and the concept of Mason's signal flow graphs. Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq. EET 1353.*

EET 1360 Engineering Analysis 1 **4 QH**
Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq. EET 1152 and MTH 1195.*

EET 1362 Basic Power Systems 1 **4 QH**
Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq. EET 1354.*

EET 1363 Basic Power Systems 2 **4 QH**
Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq. EET 1362.*

EET 1364 Basic Power Systems 3 **4 QH**
Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 1363.*

EET 1370 Digital Computers 1 **4 QH**
Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq. EET 1311.*

EET 1371 Digital Computers 2 **4 QH**
Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq. EET 1370.*

EET 1377 Control Engineering 1 **4 QH**
Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq. EET 1354 and MTH 1195.*

EET 1378 Control Engineering 2 **4 QH**
Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq. EET 1377.*

EET 1390 Optical Instrumentation **4 QH**
Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimage-forming systems used for analysis control and metrology. *Prereq. MTH 1192 and PHY 1193.*

EET 1399 Special Problems in Electrical Engineering Technology **4 QH**
Offers theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

General Engineering Technology

GET 1100 Computer Programming for Engineering Technology **4 QH**
Introduces computers for problem solving using C++ language. Topics include data types, arithmetic and logical expressions, programming loops, decision making, functions, arrays, and character string manipulation. Offers the use of the University's computer facility to run programs. *Prereq. MTH 1191 or taken concurrently.*

GET 1102 Introduction to Engineering Technology **4 QH**
Introduces the role of the engineering technologist in industry. Topics include engineering problem-solving, engineering design, and analysis of how engineering and technology devices and concepts "work." Introduces technical concepts through practical applications. Includes in-class experiments, group projects, and opportunities to apply verbal and written skills.

GET 1103 Freshman Seminar **1 QH**
Introduces students to engineering technology by identifying types of opportunities in each of the technology disciplines. Topics include a discussion of cooperative work assignments and job opportunities available to graduates. Utilizes industry speakers, faculty, and graduates. Additionally, seminars will be provided in advisory areas such as note taking, test taking, and time management.

GET 1104 **4 QH**
Introduces students to the product realization process used by most successful product companies in industry. Discusses the product development process and organizations, customer needs, product specifications, generation and selection of concepts, and industrial design. Uses industry cases and provides the needed design link from design graphics and CAD to upper level design courses. *Prereq. GET 1171.*

GET 1105 Computer Applications for Tech **4 QH**
Studies the basics of computing in a microprocessor environment (DOS, Windows, MAC, word processing, databases, spreadsheets) with emphasis on applications relevant to technology students. Provides a solid foundation upon which students can develop more extensive computer expertise. Acquired skills are transferable to subsequent courses; cooperative education assignments; and personal and professional endeavors.

GET 1170 Engineering Graphics 1 **4 QH**
Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2 **4 QH**
Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq. GET 1170 or equiv.*

GET 1320 Engineering Ethics 1 **1 QH**
Uses a case-study approach to examine basic ethical issues likely to confront engineering students on co-op and in their after-graduation professional practice. Attention is given to issues such as licensing, dissent with management, employee responsibilities, trade secrecy versus publication rights, advertising, and product liability. Discusses these issues in the context of the codes of engineering ethics of the engineering societies and general ethical theory. *Prereq. Middler standing or permission of instructor.*

GET 1356 Engineering Economy **4 QH**
Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 1191.*

GET 1364 Kinematics **4 QH**
Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions and introduces the computer as a tool to enhance these concepts. Analyzes reverted and epicyclic gear trains and cam displacement. *Prereq. GET 1171 and PHY 1191.*

Mechanical Engineering Technology

MET 1301 Mechanics A **4 QH**
Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external

and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq. MTH 1193, PHY 1191.*

MET 1302 Mechanics B **4 QH**
Emphasizes friction, second moments, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq. MET 1301.*

MET 1303 Mechanics C **4 QH**
Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq. MET 1302.*

MET 1314 Stress Analysis A **4 QH**
Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, and indeterminate members. Topics include centric loading of bolted and welded connections, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq. MET 1301.*

MET 1315 Stress Analysis B **4 QH**
Discusses beam deflections and reactions by various methods, theorem of three moments and torsional stresses and strains. Topics include pressure vessels, power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq. MET 1314.*

MET 1319 Mechanics **4 QH**
Introduces mechanics to nonmechanical majors. Topics include statics of particles and rigid bodies, and kinematics and kinetics of particles and rigid bodies. *Prereq. MTH 1193 and PHY 1191.*

MET 1330 Mechanical Design A **4 QH**
Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq. MET 1315, MET 1380.*

MET 1331 Mechanical Design B **4 QH**
Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. Emphasizes group design projects. *Prereq. MET 1330.*

MET 1333 Design Laboratory **2 QH**
Provides the opportunity for students to develop group design projects that have been developed as a part of their senior design course (MET 1330 and MET 1331). Projects will be completed and presented to their peers and to the faculty. This course must be taken in conjunction with MET 1331. *Prereq. MET 1330.*

MET 1340 Thermodynamics A **4 QH**
Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases. Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq. PHY 1192.*

MET 1341 Thermodynamics B **4 QH**
Discusses theory and analysis of actual engine types using gas and internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of gas turbine cycles, steam power cycles, cogeneration systems, and introduction to air-conditioning and refrigeration systems. *Prereq. MET 1340.*

MET 1342 Refrigeration and Air-Conditioning **4 QH**
Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1341.*

MET 1343 Heat Transfer **4 QH**
Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and heat exchanger design and selection. *Prereq. MET 1341.*

MET 1370 Fluid Mechanics A **4 QH**
Investigates hydrostatics, principles governing fluids at rest, pressure measurement, hydrostatic forces on submerged areas and objects, and simple dams. Topics include fluids in moving vessels, hoop tension fluid flow in pipes under pressure, fluid energy, power, and friction loss, Bernoulli's theorem, and flow measurement. *Prereq. MET 1302.*

MET 1371 Fluid Mechanics B **4 QH**
Explores pipe networks and reservoir systems, flow in open channels, uniform flow, energy, friction loss, minor losses, and velocity distribution. Topics include alternate stages of flow, critical flow, nonuniform flow, and accelerated and retarded flow. *Prereq. MET 1370.*

MET 1373 Fluid Mechanics **4 QH**
Covers the principles of fluid statics and dynamics. Includes topics such as fluid flow in pipes, friction losses, fluid energy, Bernoulli's theorem, flow measurement, open channel flow, pump and fan design, and selection. *Prereq. MET 1032.*

MET 1380 Materials A **4 QH**
Introduces fundamental metallic structures, general metallurgic information covering polymer, ceramic, composite, and properties, testing, and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and selection of materials for engineering applications.

MET 1388 Measurement and Analysis **5 QH**
Examines the theory of mechanical measurements, instruction, and experimentation data and report writing. Applies the principles developed in class to the laboratory, and a detailed technical report is required. Laboratory experiments include such topics as experimental analysis; statistical techniques; and mechanical

measurements of temperature, pressure, force, deformation, strain, and rotational frequency. *Prereq. MET 1195, GET 1105, and PHY 1192.*

MET 1391 Technology Laboratory A **2 QH**
Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 1315, MET 1380, MET 1390, or taken concurrently.*

MET 1392 Technology Laboratory B **2 QH**
Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, oriface plates, venturii and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq. MET 1390, MET 1370, or taken concurrently.*

MET 1393 Technology Laboratory C **2 QH**
Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq. MET 1390, MET 1341, or taken concurrently.*

MET 1394 Technology Laboratory D **2 QH**
Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq. MET 1341, MET 1343, MET 1393, or taken concurrently.*

MET 1395 Technology Laboratory E **2 QH**
Offers experiment, analytical, and design projects to examine mechanical engineering concepts. *Prereq. MET 1342, MET 1343, and MET 1390.*

MET 1396 Machine Shop **4 QH**
Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations **4 QH**
Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include design of vibration mounts for mechanical equipment, modeling of vibrational systems, shock testing, and computer applications. Laboratory experiments are included. *Prereq. MET 1303.*

MET 1416 Stress Analysis C **4 QH**
Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings, and an introduction of finite element analysis. *Prereq. MET 1315.*

MET 1444 Power Generation **4 QH**
Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation.

MET 1481 Materials B **4 QH**
Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, composites, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both metals and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystalization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq. MET 1380.*

MET 1499 Special Problems in Mechanical Engineering Technology **4 QH**
Theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

Nursing

NUR 1102 Introduction to Human Nutrition **4 QH**
Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Uses principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice. *Nursing students only.*

NUR 1107 Nursing Process and Skills **3 QH**
Emphasizes the centrality of critical thinking to clinical reasoning. Introduces the nursing process as a problem-solving tool and its application in assessing strategies of communication, gathering data, interpreting evidence, analyzing viewpoints, and forming judgments. Provides scientific principles as the framework for using basic nursing skills in the practice of selected nursing interventions. Includes practicing skills in a clinical laboratory. *Prereq. NUR 1108 and MTH 1101 or taken concurrently.*

NUR 1110 Nursing Health Assessment **4 QH**
Emphasizes dimensions of collecting data relevant to health status. Provides an opportunity for learning to use tools and skills of health assessment. Discusses ethnic, cultural, spiritual, social, psychological, developmental, and gender and physical aspects of health assessment. Explores formulating nursing diagnosis and examining the relationship of the nursing care plan to overall resources of the client. Includes practicing skills in a clinical laboratory.

NUR 1202 Pathophysiological Concepts for Clinical Nursing **4 QH**
Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological functions, endocrine functions, and skin integrity. Explores how the human body uses its adaptive powers to maintain equilibrium and how alterations affect normal processes. Examines disease processes and implications for nursing practice. *Prereq. BIO 1154 or equivalent.*

NUR 1206 Promoting Healthy Childbearing and Childrearing **8 QH**
Emphasizes the promotion of health from conception to adolescence. Describes potential and actual health-risk factors and explores risk-reduction strategies within the context of the individual, family, and community. Uses the nursing process to provide the framework for students to assess and intervene therapeutically in promoting healthy childbearing and childrearing. Examines the concepts of human development of individual, family, and community within the context of the role of the professional nurse in promoting healthy childbearing and childrearing. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1164, COP 1370, ENG 1110, ENG 1111, PSY 1111, NUR 1102, NUR 1107, and NUR 1110.*

NUR 1208 Promoting Healthy Adulthood and Aging **8 QH**
Emphasizes the promotion of health in adults and includes common health problems of adults at critical life stages from the young adult to the frail, elderly years. Analyzes potential and actual health-risk factors and the discovery of risk-reduction strategies by applying the nursing process to the care of adults living within families and communities. Enables students to use health education and teaching methods in assessing and intervening therapeutically to meet the primary health care needs of adults. Assesses the role of the nurse in partnership with the family and community in disease prevention. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1122, NUR 1206, and SOC 1100.*

NUR 1282 Wellness **4 QH**
Focuses on experiential exploration of the concept of wellness. Examines behaviors and life-style choices that lead to a high level of physical, emotional, and spiritual well-being. Includes issues of assessment of health risk, behavior change, life-style analysis, and the life cycle and stress management through self-analysis. *Open to any undergraduate student.*

NUR 1304 Independent Study Elective **2 QH**
Allows students to pursue a topic more intensely or with a special focus. Enables students to contract with a faculty member whose background, interests, and time allow direction of in-depth study. Requires student and faculty member jointly develop course objectives. *Prereq. Permission of academic adviser.*

NUR 1306 Promoting Health Restoration in Children **10 QH**
Focuses on the therapeutic nursing interventions used to restore health to children who are experiencing acute and/or complex health problems. Analyzes complex health issues within the context of the individual, family, and community. Examines altered family patterns of coping within a developmental framework and describes support to meet the unique health needs of the family and child. Addresses the therapeutic role in partnership with the family and resources available within a collaborative and interdisciplinary environment. Discusses ethical and legal dimensions of caring for children and their families. Includes clinical learning experiences in a variety of settings. *Prereq. CHM 1107, NUR 1202, NUR 1206, NUR 1208, NUR 1307, and PCL 1306.*

NUR 1307 Influences on Health and Disease **4 QH**
Enables the student to understand the values that underlie health-seeking behavior and providing care. Uses values clarification to appreciate individual rights and responsibilities versus the common good. Examines cultural differences in light of individual and group behavior as well as life span issues and family and group responsibilities. Builds a caring ethic and a sense of professional responsibility on the basis of self-awareness and self-examination.

NUR 1308 Promoting Health Restoration in Adults **10 QH**
Focuses on the therapeutic nursing interventions used to restore health to adults who are experiencing acute and/or complex health problems. Analyzes deviations from health with attention to the implications for the individual, as well as the family, in coping with health problems. Analyzes the client's health care needs and the resources to meet them, in collaboration with the client and health providers. Discusses ethical and legal dimensions of nursing care of adults. Emphasizes discharge planning and teaching. Includes clinical learning experiences in a variety of settings. *Prereq. CHM 1107, NUR 1202, NUR 1206, and NUR 1208.*

NUR 1404 The Nurse Entrepreneur **4 QH**
Focuses on the role of the nurse as an entrepreneur. Within the general functions of nursing, uses situations involving patient family teaching that provide the framework for introducing students to the essentials of undertaking this function as a business venture. Includes the formation of a nurse entrepreneur's venture action plan to do patient and family teaching. *Open to junior students in nursing.*

NUR 1406 Promoting Healthy Communities **7 QH**
Focuses on developing, implementing, and evaluating therapeutic interventions for the community as the client. Uses the nursing process, within the community context, informed by epidemiological trends, sociocultural characteristics, political and legislative influences, organizational programs, environmental factors, and consumer inputs. Emphasizes the role of the public-health nurse in multiple arenas of practice. Examines epidemiological principles and public-health policies in relation to identified health problems and conditions in a specific community. Enables students to conduct a comprehensive assessment, in partnership with the community, to develop a program to meet an identified community health need. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1306, NUR 1308, and PCL 1307.*

NUR 1408 Promoting Mental Health Restoration **7 QH**
Focuses on developing, implementing, and evaluating psychotherapeutic interventions for clients with complex mental health problems. Analyzes alterations in psychobiological and psychosocial functioning and coping. Formulates a plan of care within the context of the client as individual, family, group, and community. Emphasizes the therapeutic use of the self as students develop communication and other helping skills in interpersonal relationships with clients. Provides the opportunity to apply theories, principles, and research findings in providing mental health care for clients in various settings. Fosters collaboration with the client and interdisciplinary team. Discusses the political, legal, and ethical issues related to the delivery of mental-health services and the creative role of the nurse. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1306, NUR 1308, and PCL 1307.*

NUR 1502 Introduction to Research in Nursing **4 QH**
Builds on students' prior exposure to selected studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq. Concurrent SOC 1320 or equivalent.*

NUR 1507 Comprehensive Nursing Practicum **6 QH**
Helps students to synthesize nursing knowledge, skills, and experience and facilitate their transition to professional nursing practice and case management of clients with complex health problems. Enables students to demonstrate leadership and collaborative skills in working with other members of the health care team. Examines professional, role, and career issues in weekly seminars. Includes clinical learning experiences in a variety of settings. *Prereq. Senior standing or concurrent NUR 1406, NUR 1408, and NUR 1508.*

NUR 1508 Managing and Leading in Nursing **6 QH**
Focuses on the knowledge and skills related to the delivery of health services within a nursing management context. Presents theories, concepts, and models, such as managed care, organization and management, authority, delegation, resource allocation, budgeting, leadership and empowerment, change, motivation, environmental safety, quality improvement, collective bargaining, and conflict resolution, to give the student an understanding of the knowledge base for the management role of the baccalaureate nurse. Provides the opportunity to apply principles and practice skills in planning and delegating nursing care using different organizational models and approaches. Discusses the developing creative role for managing and leading in nursing. Includes clinical learning experiences in a variety of settings. *Prereq. Senior standing or concurrent NUR 1406 and NUR 1408.*

NUR 1606 Women's Health Choices and Decisions **4 QH**
Explores personal health and safety concerns specific to women from menarche to mid-life. Helps empower students to take charge of their health by examining personal experiences, their knowledge base, and developing self-awareness. Investigates self-promotion of health; how to be a knowledgeable consumer; when and how to choose a provider; and care options for fertility regulation, infertility, pregnancy, childbirth, and other conditions specific to women. *Open to any undergraduate student.*

Pharmacy and Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training **3 QH**
Introduces students to the profession of athletic training, presents the athletic trainer's role in the health-care community, and introduces basic injury prevention and first aid techniques. Serves to educate students about cooperative education, including resume preparation, job searches, and interview techniques. *Prereq. AT majors or permission of instructor.*

ATP1050 Emergency Care of Athletic Injuries **3 QH**
Teaches recognition and management of medical emergencies, emphasizing those conditions most commonly suffered by athletes. Upon successful completion of this course, the student will be awarded American Red Cross certification in CPR and First Aid. *Prereq. ATP 1000 or permission of instructor.*

ATP 1100 Prevention and Care of Athletic Injuries **3 QH**
Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq. ATP 1000.*

ATP 1101 Athletic Training Laboratory **1 QH**
Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills.

ATP 1110 Fundamentals of Athletic Training **3 QH**
Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions.

ATP 1200 Clinical Athletic Training **4 QH**
Introduces students to the manual skills required in the profession. Covers goniometric and anthropometric measurement; splinting, bracing, and taping; assisted ambulation techniques; and protective devices. *Prereq. ATP 1100 and ATP 1101.*

ATP 1300 Lower Extremity Evaluation **4 QH**
Focuses on the evaluation and management of orthopedic trauma of the lower extremities, head, and cervical spine. *Prereq. ATP 1200.*

ATP 1350 Upper Extremity Evaluation **4 QH**
Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq. ATP 1100 and ATP 1300.*

ATP 1360 Applied Neuroscience **5 QH**
Covers morphology and functions of the human nervous system. Discusses the normal function and structure of the nervous system and the effects of structural abnormalities on nervous system functions. Includes lecture and laboratory involving handling of human brain tissue. *Prereq. BIO 1152, BIO 1153, BIO 1154, and ATP 1300 or permission of the instructor.*

ATP 1390 Athletic Training Practicum 1 **3 QH**
Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform professional skills under a certified athletic trainer's supervision. *Prereq. ATP 1100 and ATP 1200.*

ATP 1400 Therapeutic Modalities in Athletic Training **4 QH**
Presents the physical agents used in orthopedic therapy. Emphasizes each modality's theoretical and physiological effects on the healing process and presents the indications and contraindications of use. *Prereq. ATP 1300.*

ATP 1490 Athletic Training Practicum 2 **3 QH**
Same as ATP 1390.

ATP 1500 Therapeutic Reconditioning **4 QH**
Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq. ATP 1200 and ATP 1300.*

ATP 1590 Athletic Training Practicum 3 **3 QH**
Same as ATP 1390.

ATP 1600 Organization and Administration of Athletic Training Programs **4 QH**
Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq. ATP 1100, ATP 1200, and ATP 1300.*

ATP 1690 Athletic Training Practicum 4 **3 QH**
Same as ATP 1390.

ATP 1800 Senior Seminar **4 QH**
Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq. Senior standing in the athletic training major.*

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 **1 QH**
Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health care delivery. Field trips give students the opportunity to observe professionals in their specific roles.

CPS 1112 Cardiopulmonary Sciences Seminar 2 **1 QH**
Continues CPS 1111.

CPS 1113 Cardiopulmonary Sciences Seminar 3 **1 QH**
Continues CPS 1112.

CPS 1114 Basic Life Support **1 QH**
Covers what CPR is, how it works, when CPR should be started, and when it should be stopped. Other topics include basic anatomy and physiology, prudent heart living, signals of heart

attack, actions for survival, and medicolegal considerations. Teaches the technical aspects of cardiopulmonary resuscitation and foreign body airway obstruction. Three hours of lectures will be followed by three three-hour demonstration/practice/evaluation laboratory sessions. Students successfully completing written and manikin evaluations will be issued American Heart Association BLS Healthcare Provider cards. *Enrollment is limited and preference will be given to Cardiopulmonary Science majors.*

CPS 1211 Practicum in Respiratory Care **4 QH**
Provides clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq. CPS 1320 and CPS 1321. CPS 1301 and CPS 1332 taken concurrently.*

CPS 1301 Professional Practice Laboratory 1 **1 QH**
Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq. CPS 1321 and CPS 1332 concurrently.*

CPS 1302 Professional Practice Laboratory 2 **1 QH**
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1301, CPS 1211 and CPS 1433 concurrently.*

CPS 1314 Practicum in Respiratory Care 2 **6 QH**
Focuses on treating patients with more complex cardiorespiratory disorders. The second course in a sequence of three directly related to the clinical practice of various modalities of respiratory care. *Prereq. CPS 1211, CPS 1302, CPS 1433, and CPS 1434.*

CPS 1315 Practicum in Respiratory Care 3 **6 QH**
Provides clinical experience in hospitals. Emphasizes respiratory care for adult, pediatric, and neonatal critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq. CPS 1314, CPS 1403, CPS 1434 and CPS 1404 and CPS 1576 concurrently.*

CPS 1320 Cardiopulmonary Physiology **4 QH**
Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Prereq. PAH 1202 and PAH 1204 or equivalent.*

CPS 1321 Cardiopulmonary Disease **4 QH**
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq. CPS 1320, PAH 1202 and PAH 1204.*

CPS 1332 Introduction to Respiratory Care **4 QH**
Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. Basic to all other professional respiratory therapy courses. *Prereq. CPS 1321 and CPS 1301 concurrently.*

CPS 1403 Professional Practice Laboratory 3 **1 QH**
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1302 and CPS 1434 concurrently.*

CPS 1404 Professional Practice Laboratory 4 **1 QH**
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1403 and CPS 1576 concurrently.*

CPS 1408 Research Design **4 QH**
Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq. Statistics.*

CPS 1414 Clinical Seminar 1 **1 QH**
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq. CPS 1314 concurrently.*

CPS 1415 Clinical Seminar 2 **1 QH**
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq. CPS 1315 concurrently.*

CPS 1433 Respiratory Care for the Medical and Surgical Patient **4 QH**
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq. CPS 1211, CPS 1332, and CPS 1302 concurrently.*

CPS 1434 Respiratory Care for the Critical Patient **4 QH**
Focuses on respiratory-care problems encountered with patients in intensive care units. The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. *Prereq. CPS 1433 and CPS 1403 concurrently.*

CPS 1516 Advanced Clinical Seminar 1 **1 QH**
Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq. CPS 1641 concurrently.*

CPS 1517 Advanced Clinical Seminar 2 **1 QH**
Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq. CPS 1642 concurrently and CVT status.*

CPS 1518 Advanced Clinical Seminar 3 **1 QH**
Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq. CVT senior status.*

CPS 1570 Fundamentals of Perfusion Technology **4 QH**
Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfu-

sion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. *Prereq. Perfusion Technology students only.*

CPS 1571 Advanced Life Support Systems 1 **4 QH**
Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq. Senior status in CPS.*

CPS 1572 Perfusion Technology **4 QH**
Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq. CPS 1570.*

CPS 1576 Neonatal and Pediatric Respiratory Care **4 QH**
Provides students with an understanding of the methods and techniques of respiratory therapy for neonatal and pediatric patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq. RT senior status.*

CPS 1578 Advanced Medical Monitoring **4 QH**
Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq. Perfusion Technology students only.*

CPS 1611 Kinesiology **4 QH**
Investigates the science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq. PAH 1202 and PAH 1204 or equivalent.*

CPS 1612 Exercise Physiology 1 **4 QH**
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Does not include a lab. *Prereq. PAH 1202 and PAH 1204.*

CPS 1613 Laboratory in Clinical Exercise Testing and Prescription **4 QH**
Presents a didactic and lab experience in assessing cardiopulmonary function, and muscular strength and endurance, as well as body composition, in a variety of clinical syndromes. Gives students the opportunity to prescribe exercise programs for a variety of special populations. *Prereq. CPS 1615 and CPS 1619.*

CPS 1614 Electrocardiography **4 QH**
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq. PAH 1202 and PAH 1204 or equivalent.*

CPS 1615 Exercise Physiology 1 **5 QH**
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Includes a laboratory. *Prereq. PAH 1202 and PAH 1204.*

CPS 1616 Exercise Physiology 2 **4 QH**
Studies the role of exercise in health and disease, including acute and chronic effects of exercise upon the cardiovascular, pulmonary, and metabolic systems of individuals with cardiovascular, pulmonary, or metabolic diseases. Specifically explores therapeutic benefits of exercise intervention and rehabilitation for individuals with heart disease, chronic obstructive pulmonary disease, diabetes, obesity, osteo- and rheumatoid arthritis, osteoporosis, and low back pain. *Prereq. CPS 1615.*

CPS 1618 Cardiopulmonary Assessment **5 QH**
Provides students with the opportunity to gain knowledge and understanding of physiological principles and concepts related to clinical cardiopulmonary assessment. Integrates lecture topics with practical laboratory experiences in physical examination techniques, basic pulmonary function assessment, laboratory studies, and graded exercise testing with 12-lead electrocardiography. *Prereq. CPS 1320 and CPS 1321.*

CPS 1619 Exercise Prescription and Programming in Cardiovascular Health **4 QH**
Focuses on skills needed to develop individualized exercise prescriptions for apparently healthy patients. Concentrates on the design, implementation and evaluation of fitness and wellness programs for individuals and groups in a corporate or commercial setting. *Prereq. CPS 1320 and CPS 1615 concurrently.*

CPS 1622 Clinical Exercise Physiology Practicum 1 **6 QH**
Provides a professional field assignment in a clinical setting designed to help prepare students in their professional career choice. Students will complete a rotation in exercise testing and cardiac rehabilitation. During the course, students will assume more patient care responsibility and develop the skills necessary to function independently. *Prereq. Coursework through Quarter 9 in Exercise Physiology curriculum.*

CPS 1623 Clinical Exercise Physiology Practicum 2 **6 QH**
Offers a professional field assignment in a clinical setting designed to help prepare students in their professional career choice. Students will complete a rotation in one of the following: exercise testing, cardiac rehabilitation, pulmonary rehabilitation, diabetic rehabilitation, or nonclinical adult fitness/health promotion. During the course, students will assume more patient care responsibility and develop the skills necessary to function independently. *Prereq. CPS 1622.*

CPS 1632 Health Science Education **4 QH**
Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills. *Prereq. CPS junior status.*

CPS 1641 Fundamentals of Cardiac Catheterization **4 QH**
Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. *Prereq. CPS 1320 and CPS 1321.*

CPS 1642 Advanced Cardiac Catheterization **4 QH**
Covers advanced cardiac catheterization interventional techniques such as coronary angioplasty, stents, and atherectomy.

Introduces new technologies such as coronary rotablator and lasers. Includes other techniques such as the intra-aortic balloon pump, cardiac pacemakers, and cardiac studies using biopsy, pericardiocentesis, and electrophysiology. *Prereq. Senior year status, CPS 1516, CPS 1641, and CPS 1644 concurrently.*

CPS 1643 Echocardiography **4 QH**
Provides a comprehensive course in adult echocardiography, including an introduction to basic cardiac embryology and cardiac physics. Outlines and discusses M-Mode, 2-D, and Color Doppler techniques. Covers transducer positions and echo features of normal versus abnormal echo findings in valvular heart disease, prosthetic heart valves, pericardial disease, and cardiac tumors. *Prereq. Anatomy and Physiology 1 and 2, Pathophysiology or equivalent.*

CPS 1644 Cardiovascular Technology Internship **6 QH**
Provides cardiovascular technology students with the opportunity to develop, practice, and master skills required to assist with diagnostic and interventional procedures in the cardiac catheterization laboratory. *Prereq. CPS 1642 concurrently.*

CPS 1645 Practicum in Cardiovascular Technology 2 **6 QH**
Provides cardiovascular technology (CVT) students with the clinical opportunity to develop procedural skills for assisting with cardiac catheterization and echocardiography. During the practicum, the student will assume greater CVT responsibility and develop the technical skills necessary to function independently. Emphasizes students' ability to assist the physician, evaluate the patient's clinical status and update the physician, and problem solve to meet the needs of the patient. *Prereq. CPS 1643 concurrently.*

CPS 1801 Directed Independent Study 1 **2 QH**
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Formerly RTH 1801.*

CPS 1802 Directed Independent Study 2 **2 QH**
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Formerly RTH 1802.*

CPS 1810 Continuation of Clinical **0 QH**
Provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in CPS 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for CPS 1515, and I grades will be changed to the grades earned at that time. *Formerly RTH 1810.*

CPS 1820 Internship in Cardiovascular Health and Exercise **12 QH**
Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting. Students must successfully complete 360 hours of internship experience in addition to other written assignments. *Prereq. Completion of quarter 9 in the cardiovascular health and exercise curriculum. Formerly HSL 1800/1801.*

Counseling Psychology, Rehabilitation, and Special Education

CRS 1200 Introduction to Special Education **4 QH**
Surveys the characteristics and the social, emotional, and educational adjustment of individuals with special needs. Reviews legislation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular education settings and also in the community. Introduces principles of instruction and the development of strategies for the generation of Individualized Education Programs (IEPs).

CRS 1314 Introduction to Counseling **4 QH**
Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs **4 QH**
Presents an overview of the etiology and development of disabling conditions and their impacts on infants, children, and youth with special needs. Discusses a variety of biological and environmental risk factors associated with learning problems.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education **4 QH**
Presents the process of assessment, program planning, and implementation for individuals with special needs. Requires students to administer education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation.

CRS 1317 Student Teaching and Seminar in Special Education **8 QH**
Allows for full-time participation in a University-arranged and supervised school program, emphasizing inclusive settings. Gives the student the opportunity to analyze the teaching of and the learning by students with special needs and to demonstrate, evaluate, and develop teaching skills. *Prereq. Advanced professional sequence with minimum 2.5 QPA both overall and in teaching major.*

CRS 1500 Mental Health **4 QH**
Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

CRS 1502 Communicable and Degenerative Diseases **4 QH**
Focuses on the disease immunity process, with emphasis on prevalent communicable diseases in the United States today and their transmission. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other communicable and degenerative diseases and disorders that affect the nation's health.

CRS 1503 Human Sexuality and Family Dynamics **4 QH**
Examines sexuality from a physical, psychological, social, historical, and cultural perspective. Considers sexual needs and concerns about sexuality at various stages in life, including a variety of approaches to sexuality education. *Prereq. Middler standing or above.*

CRS 1510 Health Counseling **4 QH**
Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health professionals in dealing more effectively with various health issues. *Prereq. Junior standing or above.*

CRS 1800 Directed Study **4 QH**
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

Dental Hygiene

DHY courses are open only to Forsyth Dental Hygiene students unless otherwise indicated.

DHY 1100 Oral Anatomy and Histology **3 QH**
Introduces the student to the structures of the oral cavity. Includes the embryology and histology of the head and neck structures with primary emphasis on the oral cavity. Studies the formation, eruption patterns, and morphology of the primary and permanent dentitions.

DHY 1101 Dental Hygiene Orientation 1 **2 QH**
Presents an overview of issues relating to the profession of dental hygiene including historical development with emphasis on the philosophy, responsibilities, and current roles of the dental hygienist as a member of the dental health team. Reviews dental terminology. Covers dental manpower and dental delivery systems. *This course is open to non-dental hygiene majors.*

DHY 1102 Dental Hygiene Orientation 2 **2 QH**
Continues DHY 1101. Presents an overview of the dental hygiene process of care to include assessment, diagnosis, planning, implementation, and evaluation. Covers infection control, medical/dental terminology, and principles of four-handed dentistry. Includes a laboratory component. *This course is open to non-dental hygiene majors.*

DHY 1104 Dental Procedures 1 **3 QH**
Introduces the student to the discipline of dentistry. Reviews dental specialties with attention given to the roles and responsibilities of the dental assistant. Places emphasis on exposure control, four-handed dentistry, and use and manipulation of some dental materials. A laboratory component is included. *This course is open to non-dental hygiene majors.*

DHY 1105 Dental Procedures 2 **4 QH**
Continues DHY 1104. Includes a clinical internship in the Harvard School for Dental Medicine postdoctoral training clinics. Students will have an opportunity to apply skills learned in DHY 1104. *Prereq. DHY 1104. This course is open to non-dental hygiene majors.*

DHY 1204 Head and Neck Anatomy **2 QH**
Provides a clinical study of anatomy of the head and neck. Emphasizes deviations from normal anatomy and the diagnosis and management of these deviations as they relate to the patient. *This course is open to non-dental hygiene majors.*

DHY 1209 Periodontology **3 QH**
Builds upon oral anatomy and pre-clinical dental hygiene concepts presented in the fall quarter. Discusses the histopathology, etiology, and clinical features of periodontal infections. Includes current concepts in risk assessment and diagnostics. Emphasizes diagnosis, treatment planning, and clinical management of periodontal patients. Includes a one-hour seminar. *Formerly DHY 1208.*

DHY 1211 Dental Hygiene Theory 1 **2 QH**
Encompasses the fundamentals of the science of dental hygiene. Introduces the basic principles and skills utilized to provide oral health care for the patient.

DHY 1212 Dental Hygiene Theory 2 **2 QH**
Provides the student with information necessary for the dental management and treatment of the medically compromised patient. Discusses the etiology, clinical and oral manifestations, treatment planning, and management considerations for the major medical conditions of concern in dentistry. In addition to assigned readings and lecture information, students will participate in case method projects to facilitate the clinical application of the course material.

DHY 1214 Dental Hygiene Theory 3 **2 QH**
Discusses the dental hygiene management of patients with special developmental/acquired, medical/physical, sensory and/or psychological needs. Includes topic areas of gerodontics disabling/handicapping conditions, major psychiatric diseases, dependency disorders, and the cancer patient. Emphasizes the barriers and access to care, patient management via normalization of care, the use of adaptive aids, preventive techniques, and individualized treatment planning. *Formerly DHY 1314.*

DHY 1220 Radiology 1 **2 QH**
Uses lectures, slides, and laboratory experiences to provide the student with a basic knowledge and understanding of radiation biology and hygiene; radiographic image receptors and the developing process; and the fundamentals of dental radiography including the production and projection of X-rays. Emphasizes radiographic surveys by means of the paralleling, bisecting angle, and extra-oral techniques.

DHY 1221 Radiology 2 **1 QH**
Continues DHY 1220. Students refine their skills in producing diagnostically acceptable radiographs. Emphasizes interpreting films for projection, exposure, processing errors, normal radiographic anatomy, and common diseases/anomalies of the teeth and bone.

DHY 1228 Dental Materials **3 QH**
Studies the basic composition and properties of dental materials utilized in dental hygiene practice. Emphasizes the selection, manipulation, and clinical management of dental materials. Examines the relationship between the oral environment and dental materials. Laboratory sessions are integrated with lectures to provide the student with the opportunity to practice various techniques such as mixing cements, pit and fissure sealants, polishing of amalgam and composite restorations, impression taking, and study models.

DHY 1240 Nutrition **2 QH**
Introduces the science of human nutrition based upon the principles of biochemistry. Reviews the nature and function of the micro- and macronutrients essential for health with specific emphasis on

the role diet and nutrition play in the prevention of diseases and the promotion of optimum health and oral wellness. *This course is open to non-dental hygiene majors.*

DHY 1301 Introduction to Oral Health Research **3 QH**
Introduces the currently accepted theories and methods of oral health research. Studies research methods, experimental design, and statistical methods with emphasis on dental epidemiology and clinical research. Reviews current dental research from dental journals to evaluate the methods, design, validity, and relevancy of the research on the professions of dentistry and dental hygiene. Discusses future research and advances in technology to help the student gain a perspective on needed research. Funding sources will also be reviewed.

DHY 1308 Pathology **4 QH**
Emphasizes oral pathology. Covers normal structures of the oral cavity, principles of general pathology, including inflammation, neoplasia and diseases/conditions of the oral cavity and its environs, with clinical features, some histopathology, the course of the disease(s), and treatment. Stresses common developmental disorders, cysts of the jaws and neck, caries, pulpitis, other dental defects, mucous membrane pathology, viral, bacterial and fungal diseases, white lesions, benign and malignant oral diseases, pigmented dental and mucosal lesions, allergies, and oral manifestations of systemic diseases. *Formerly DHY 1206 and DHY 1307, Pathology 1 and 2.*

DHY 1315 Dental Hygiene Theory 5 **2 QH**
Introduces dental specialties through lectures, slides, and case presentations of dental procedures related to individual specialties. Topics presented by guest lecturers include orthodontics, endodontics, oral and maxillofacial surgery, prosthodontics, temporomandibular disorders (TMD), dental implants, maxillofacial prosthetics, pediatric dentistry, and radiovisiography.

DHY 1316 Dental Hygiene Theory 6 **2 QH**
Presents material to assist the dental hygiene student to develop the management skills needed to become an effective and productive member of the dental team. Emphasizes identifying professional goals, developing communication skills, writing resumes, perfecting interviewing techniques, and recognizing employer/employee responsibilities and expectations.

DHY 1317 Dental Hygiene Theory 4 **2 QH**
Presents material that focuses on the preventive services of dental hygiene care. Students will consider the role of the dental hygienist relative to caries control, fluoride recommendations, and dietary counseling. Students will integrate concepts of oral wellness and smoking cessation into client care plans as well as examine the delivery of preventive services to clients. Students will also examine chair-side ergonomics for prevention of occupational injuries to themselves.

DHY 1330 Pharmacology **3 QH**
Places initial emphasis on nomenclature to familiarize the student with the terminology used in pharmacology. Undertakes the study of drugs to acquaint the student with their origin, physical and chemical properties, preparation, modes of administration, and effects upon the body systems. Gives special consideration to those drugs which are of dental value, including antiseptics, antibiotics, pain relieving drugs, and the anesthetics. *This course is open to non-dental hygiene majors.*

DHY 1331 Pain Control **2 QH**
Introduces the dental hygiene student to the recognition and management of pain, fear, and anxiety associated with dental treatment. Lectures will cover basic and current concepts in pain and anxiety control in dental treatment. *Prereq. Current certification in cardiopulmonary resuscitation and DHY 1330.*

DHY 1361 Public Health **2 QH**
Introduces current principles and issues in public health and their relationship to the delivery of oral health care to the public. Investigates and discusses the principles of epidemiology, health care delivery, biostatistics, allied health utilization, and fluoridation. Provides each student with the opportunity to select one issue in public health and explore it by writing a short position paper.

DHY 1362 Community Health **2 QH**
Examines the topics related to community oral health. Explores the principles of program planning and basic health education methods and materials. Provides each student with the opportunity to select a population of interest in the community and plan, implement, and evaluate a preventive oral health program according to the needs of that population. This experience may help students to recognize a commitment to the community and to accept the responsibilities of a health care professional.

DHY 1364 Seminar in Legal Issues and Ethics **2 QH**
Provides a profile of the dental hygienist within a legal and ethical framework. Examines state practice acts. Students will explore the responsibilities involved in hygienist/patient and employee/employer relationships. Investigates the legal ramifications of a variety of practice settings. Uses case studies and values clarification models to encourage ethical and professional development.

DHY 1401 Oral Health Gerontology **4 QH**
Introduces the dental hygiene student to oral health gerontology. Reviews the biological, psychological, and social aspects of aging. Places an emphasis on oral tissues. Discusses in detail dental hygiene treatment planning and evaluation for both institutionalized and community based elderly patients. Examines public policy and financing of oral health care for the aged. *Prereq. Extra mural experience required.*

DHY 1402 Advanced Public Health **4 QH**
Studies the current issues surrounding today's public health care delivery system in depth. Places emphasis on health legislation both at the state and federal levels. Issues include access to health care, quality assurance/control, and health care costs and financing. Includes evaluation of possible solutions in terms of appropriateness, effectiveness, and economy and a review of health care delivery systems. Students will utilize the principles of oral epidemiology through surveys of specified area populations to develop a health promotion plan.

DHY 1403 Dental Seminars **4 QH**
Reviews the current concepts in dentistry and dental hygiene theory and practice. Discusses the impact of new knowledge on the art and science of dentistry, dental hygiene, and prevention of dental disease. Topics will be determined by current literature and the political and socio-economic climate of the times. Uses integration and sharing of personal experiences and practices relating to dental hygiene to assess and improve student's communication, leadership, decision making, and organizational skills.

DHY 1410 Independent Study **4 QH**
Gives students an opportunity to explore in depth a subject relevant to their interests. Provides the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities.

DHY 1550 Internship **6 QH**
Provides professional field assignment in a setting designed to enhance students in their professional career development. Includes supervision by faculty, conferences with professional staff, and projects. Internship may be spread over more than one academic quarter. A minimum of 180 hours is required.

DHY 1611, DHY 1612 Clinical Dental Hygiene 1 and 2 **3 QH each**
Provides pre-clinical and laboratory instruction in the techniques utilized for the complete evaluation and prophylaxis of patients including instrumentation, polishing, patient evaluation procedures, oral physiotherapy, prevention of disease transmission, medical emergencies, and treatment planning. Pre-clinical activities are coordinated with DHY 1211 and DHY 1212. Actual delivery of patient care begins in DHY 1612. Students will be responsible for patient recruitment. A weekly seminar in DHY 1612 will be conducted for discussion of medically compromised patient cases and patient management strategies.

DHY 1613 Clinical Dental Hygiene 3 **3 QH**
Provides dental hygiene and other procedures for both adult and child patients in the Forsyth Clinic. Students will be responsible for patient recruitment. A weekly seminar is included for the discussion of patient cases.

DHY 1614, DHY 1615, DHY 1616 **6 QH each**
Clinical Dental Hygiene 4, 5, and 6
Provides clinical experience to the dental hygiene student. Students provide preventive, educational, and therapeutic oral health services as delegated by the Commonwealth of Massachusetts at our dental hygiene clinic to children and adults on an appointment basis. Students will be responsible for patient recruitment. In addition to the clinical training at the Forsyth Dental Center dental hygiene clinic, students supplement this training via extramural rotations at area hospitals, community health care centers, and public health care programs. A weekly one-hour seminar relates dental hygiene theory to clinical practice.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming **1 QH**
Focuses on basic swimming skills for non-swimmers, with emphasis on personal water safety.

HSL 1101 Intermediate Swimming **1 QH**
Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq. HSL 1100 or equivalent.*

HSL 1106 Beginning Scuba **2 QH**
Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq. HSL 1101 or equivalent.*

HSL 1107 Sailing **1 QH**
Focuses on basic skills in sailing.

HSL 1109 Beginning Gymnastics 1 **1 QH**
Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1114 Badminton **1 QH**
Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis **1 QH**
Focuses on basic tennis strokes, concepts, rules, strategies, and game play.

HSL 1121 Beginning Self-Defense **1 QH**
Surveys the principles and fundamental skills at the beginning and intermediate levels.

HSL 1124 Beginning Fencing **1 QH**
Focuses on the fundamental principles and techniques of fencing at the beginner level.

HSL 1126 Karate 1 **1 QH**
Focuses on fundamental techniques of unarmed combat for self-defense using the punches, kicks, and blocks of Tae Kwan Do/Karate.

HSL 1127 Karate 2 **1 QH**
Continues HSL 1126, with progression to more complex techniques and combinations of punches, kicks, and blocks related to Tae Kwan Do/Karate. *Prereq. HSL 1126.*

HSL 1131 Yoga **1 QH**
Introduces yoga skills and techniques for men and women at the beginning level.

HSL 1132 Weight Training **1 QH**
Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.

HSL 1133 Physical Conditioning **1 QH**
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.

HSL 1134 Aerobic Exercise and Dance **1 QH**
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.

HSL 1138 Beginning Skiing **1 QH**
Focuses on fundamental techniques of downhill skiing. Lab fee.

HSL 1139 Intermediate Skiing **1 QH**
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. *Prereq. HSL 1138.*

HSL 1140 Basketball **1 QH**
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.

HSL 1142 Volleyball **1 QH**
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.

HSL 1150 Soccer **1 QH**
Focuses on knowledge and skill appropriate to play soccer at the beginning level.

HSL 1153 Modern Dance 1 **1 QH**
Introduces modern dance technique and style.

HSL 1154 Modern Dance 2 **1 QH**
Continues HSL 1153, with progression to more complex modern dance techniques and combinations. *Prereq. HSL 1153 or equivalent.*

HSL 1155 Modern Dance 3 **1 QH**
Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. *Prereq. HSL 1154 or equivalent.*

HSL 1156 Ballet 1 **1 QH**
Introduces ballet fundamentals, with emphasis on alignment.

HSL 1157 Ballet 2 **1 QH**
Continues HSL 1156, with emphasis on developing lyrical style. *Prereq. HSL 1156 or equivalent.*

HSL 1159 Jazz Dance 1 **1 QH**
Introduces the fundamentals of jazz dance, with emphasis on alignment.

HSL 1160 Jazz Dance 2 **1 QH**
Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. *Prereq. HSL 1159 or equivalent.*

HSL 1163 Ballroom Dance **1 QH**
Introduces traditional and contemporary partner dancing.

HSL 1164 Ballroom Dance 2 **1 QH**
Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. *Prereq. HSL 1163.*

HSL 1167 Beginning Racquetball **1 QH**
Focuses on knowledge and skills appropriate to play racquetball at the beginning level.

HSL 1173 Beginning Track and Field **1 QH**
Focuses on the fundamental skills in the various track and field events.

HSL 1180 Health and Physical Education in the Elementary School **4 QH**
Focuses on introductory knowledge and skills necessary for teaching health and physical education to elementary school children. Emphasizes the importance of the elementary school years for health promotion and positive health behaviors, motor skill development, the implications of health-related fitness, and activities that maximize participation for children in vigorous activity promoting wellness. *Replaces HSL 1151.*

HSL 1254 First Aid **2 QH**
Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.

HSL 1263 Motor Development and Learning **4 QH**
Studies the development of motor skills from early childhood through adolescence. Considers age expectations for perceptual motor behavior. Focuses on how information processing is involved in motor learning and performance. Applies basic research data to learning and executing skill in a variety of sport settings.

HSL 1266 Physical Conditioning Programming **2 QH**
Focuses on how to design and deliver instruction related to physical conditioning and exercises. *Prereq. HSL 1132 and HSL 1133.*

HSL 1270 Health and Motor Development in Early Childhood **4 QH**
Focuses on social, cognitive, and physical aspects influencing health and motor development in preschoolers and across the life span. Emphasizes the importance of the early childhood years for health promotion and positive health behaviors. Studies the development of fundamental motor patterns (walking, running, catching, throwing, striking, climbing, etc.) including perceptual-motor implications. Provides an opportunity to work directly with a preschooler in a laboratory setting observing and assessing fundamental motor patterns and health behaviors. *Replaces HSL 1265.*

HSL 1286 Nutrition **4 QH**
Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.

HSL 1325, HSL 1326, HSL 1327 **1 QH each**
Dance Rehearsal and Performance 1, 2, 3
Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq. Permission of instructor.*

HSL 1463 Overview of Physical Disabilities **4 QH**
Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.

HSL 1511 Independent Study 1 **1 QH**

HSL 1512 Independent Study 2 **2 QH**

HSL 1513 Independent Study 3 **3 QH**

HSL 1514 Independent Study 4 **4 QH**
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.

HSL 1599 Theory of Coaching **4 QH**
Provides students with the opportunity to study and analyze learning principles, leadership skills, sociology, and psychology as applied to coaching teams and individuals. Focuses primarily on athletes of junior and senior high school age.

HSL 1600 Psychology of Sport **2 QH**
Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq. Physical education major or permission of instructor.*

HSL 1601 Sociology of Sport **2 QH**
Studies sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.

HSL 1777 Honors Adjunct **1 QH**
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.

Medical Laboratory Science

MLS 1101 Medical Laboratory Science Orientation 1 **1 QH**
Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2 **1 QH**
Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1104 Laboratory Techniques **3 QH**
Covers the principles and theories of basic technical skills needed to work competently in a clinical or research laboratory. Discusses issues concerning laboratory safety, aseptic technique, OSHA regulations, quality control, quality assurance, solution preparation, and method evaluation and applies them in a laboratory component. *Prereq. CHM 1122, or concurrently.*

MLS 1109 Foundations of Clinical Laboratory Science **4 QH**
Examines basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq. Admission to physician assistant program or permission of instructor.*

MLS 1112 Renal Physiology and Urinalysis **2 QH**
Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. *Prereq. BIO 1109 and CHM 1111.*

MLS 1125 Hematology **4 QH**
Examines basic hematology procedures and principles. Emphasizes hematopoiesis, hematologic cell maturation, normal and abnormal cell morphology, basic hemostasis, and coagulation testing. *Prereq. BIO 1109, CHM 1122, MLS 1104, or permission of instructor.*

MLS 1132 Immunohematology **3 QH**
Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. *Prereq. BIO 1109, BIO 1172, or permission of instructor.*

MLS 1145 Microbiology **4 QH**
Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. *Prereq. BIO 1109, CHM 1122, and MLS 1172.*

MLS 1152 Clinical Chemistry and Instrumentation **4 QH**
Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. *Prereq. CHM 1122, MLS 1104, and MLS 1112.*

MLS 1172 Immunology **2 QH**
Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and non-specific host response. Covers common laboratory methods for the detection of antigens and antibodies. *Prereq. BIO 1109 and CHM 1122.*

MLS 1212 Urinalysis Laboratory **1 QH**
Laboratory for MLS 1112.

MLS 1225 Hematology Laboratory **1 QH**
Laboratory for MLS 1125.

MLS 1232 Immunohematology Laboratory **1 QH**
Laboratory for MLS 1132.

MLS 1245 Microbiology Laboratory **1 QH**
Laboratory for MLS 1145.

MLS 1252 Clinical Chemistry and Instrumentation Laboratory **1 QH**
Laboratory for MLS 1152.

MLS 1412 MLT Special Topics—Applied Microscopy **2 QH**
Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT (NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1423 MLT Applied Study in Hematology **2 QH**
Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1432 MLT Applied Study in Blood Banking **2 QH**
Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1442 MLT Applied Study in Clinical Microbiology **2 QH**
Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)- level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1452 MLT Applied Study in Clinical Chemistry **2 QH**
Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)- level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1480 MLT Seminar 1 **2 QH**
Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. *Prereq. Admission to MLT Clinical Program.*

MLS 1523 Hematology MT Applied Study **4 QH**
Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1533 Immunohematology MT Applied Study **4 QH**
Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1544 Clinical Microbiology MT Applied Study **7 QH**
Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1552 Clinical Chemistry MT Applied Study **7 QH**
Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1573 Clinical Immunology MT Applied Study 1 **1 QH**
Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT (ASCP)- and CLS (NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1574 Clinical Immunology MT Applied Study 2 **1 QH**
Continues MLS 1573.

MLS 1621 Advanced Hematology 1 **3 QH**
Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoisis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq. MLS 1125 or permission of instructor.*

MLS 1623 Special Topics: Hemostasis **1 QH**
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq. MLS 1125 or permission of instructor.*

MLS 1631 Advanced Immunohematology **2 QH**
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq. MLS 1132.*

MLS 1648 Advanced Clinical Microbiology **4 QH**
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. *Prereq. MLS 1145 and MLS 1245.*

MLS 1649 Medical Parasitology and Mycology **3 QH**
Discusses the parasites and fungi that are pathogenic to man, including pathogenesis, relevant clinical symptoms, and diagnostic criteria. Emphasizes the laboratory procedure used in their diagnosis and organism characteristics used for identification. *Prereq. BIO 1109, MLS 1145, and MLS 1245.*

MLS 1656 Advanced Clinical Chemistry **4 QH**
Discusses advanced principles of clinical chemistry and some instrumentation, as well as acquisition, management, and application of laboratory data. Studies methods of quantitating clinically significant analytes, including pathophysiology of related disease states. *Prereq. BIO 1109, CHM 1265, and MLS 1152.*

MLS 1661 Medical Laboratory Science Education **2 QH**
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq. Concurrent with Quarter 8 of MLS program.*

MLS 1662 Clinimetrics **2 QH**
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq. Permission of instructor.*

MLS 1665 Medical Laboratory Management **2 QH**
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq. Concurrent with MT clinical applied study.*

MLS 1672 Immunopathology **3 QH**
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq. MLS 1172.*

MLS 1680 MLS Special Topics **2 QH**
Discusses current topics in the clinical lab. *Prereq. Permission of instructor.*

MLS 1681 MLS Senior Seminar **2 QH**
Reviews current undergraduate medical lab science topics.

MLS 1890 Undergraduate Research **2 QH**
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq. Permission of instructor.*

MLS 1891 MLS Current Concepts **1 QH**
Discusses topics determined by recent advances in medical lab science.

Pharmacy

PAH 1101 Health Career Seminar **1 QH**
Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation. Allows students to gather information about the five majors within the Bouvé College of Pharmacy and Health Sciences.

PAH 1135 Professional Dynamics in the Health Care Delivery System **4 QH**
Examines the evolution of the American health care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1 **5 QH**
Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq. CHM 1122 or BIO 1142, and BIO 1109.*

PAH 1204 Anatomy-Physiology 2 **5 QH**
Covers structure and function of the various life-supportive systems not covered in the first quarter. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq. PAH 1202 or permission of instructor.*

PAH 1210 Anatomy-Physiology 1 **4 QH**
Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq. MLS majors or permission of instructor.*

PAH 1211 Anatomy-Physiology Laboratory 1 **1 QH**
Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq. Permission of instructor.*

PAH 1212 Anatomy-Physiology 2 **4 QH**
Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq. Permission of instructor.*

PAH 1213 Anatomy-Physiology Laboratory 2 **1 QH**
Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq. Permission of instructor.*

PAH 1280 Biochemistry **5 QH**
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq. BIO 1109 and CHM 1269.*

PAH 1776 Junior/Senior Honors Thesis **4 QH**
Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq. Honors participation.*

PAH 1777 Honors Adjunct **1 QH**
Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (1 NI) or PAH honors advisor. *Prereq. Honors participation and permission of instructor.*

PCL 1306 Pharmacodynamics 1 **2 QH**
Introduces pharmacologic principles, with the individual pharmaceuticals of drug groups and individual pharmaceuticals of particular importance in the diagnosis and treatment of disease. Focuses primarily on the applications of such principles and agents to the nursing profession. *Prereq. BIO 1120, BIO 1164, CHM 1105, and CHM 1106.*

PCL 1307 Pharmacodynamics 2 **2 QH**
Continues the topics introduced in PCL 1306. *Prereq. PCL 1306.*

PCL 1409 Pharmacology for the Respiratory-Care Practitioner **4 QH**
Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner. *CPS students only or permission of instructor. Prereq. PAH 1202 and PAH 1204.*

PCL 1420 Pharmacology/Medicinal Chemistry 2 **6 QH**
Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq. PMC 1419 and middler standing.*

PCL 1422 Pharmacology/Medicinal Chemistry 3 **6 QH**
Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autacoids, and antineoplastics. *Prereq. PCL 1420 and junior standing.*

PCL 1453 Pharmacology Laboratory **1 QH**
Examines the scientific process through which new drugs are discovered, with emphasis on critical assessment of experimental variability. Compares and contrasts laboratory studies in reductionist systems with clinical trials in human patients. Provides students with the opportunity to learn how to locate, evaluate, and explain technical information pertinent to pharmacy through individual library research projects, student discussions, and a term paper. *Prereq. PMC 1419 and middler standing.*

PCL 1801, PCL 1802, PCL 1803 **4 QH each**
Special Research Project (Pharmacology)
Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor and program director.*

PCT 1240 Pharmaceutical Calculations **4 QH**
Introduces the application of mathematical concepts in phar-

macy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceutics and for improving problem-solving skills using computers. *Prereq. BIO 1109, CHM 1122, and MTH 1108.*

PCT 1300 Dosage Forms **4 QH**
Focuses on the formulation and administration of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Formerly PCT 1350 Pharmaceutics 2. Prereq. MTH 1108, PHY 1203, CHM 1269, PAH 1280, and PCT 1240 or concurrent enrollment and middler standing.*

PCT 1320 Dosage Forms Laboratory **2 QH**
Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. Lab fee. *Formerly Pharmaceutics Laboratory 2. Prereq. PCT 1240 and PCT 1300 or concurrent enrollment and middler standing.*

PCT 1340 Physical Pharmacy **4 QH**
Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, coarse dispersion, diffusion and membrane transport, and chemical kinetics. *Formerly Pharmaceutics 1. Prereq. PCT 1300, PCT 1320, and middler standing.*

PCT 1360 Physical Pharmacy Laboratory **2 QH**
Focuses on the physiochemical principles and techniques of pharmaceutal preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. *Formerly Pharmaceutics Laboratory 1. Prereq. PCT 1300, PCT 1320, and PCT 1340 or concurrent enrollment and middler standing.*

PCT 1440 Biopharmaceutics/Pharmacokinetics **4 QH**
Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses the general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq. MTH 1108, PAH 1204, PAH 1280, PCT 1240, PCT 1300, PCT 1320, PCT 1340, PCT 1360, and junior standing.*

PCT 1801, PCT 1802, PCT 1803 **4 QH each**
Pharmaceutics Special Research Project
Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor(s) and program director.*

PHP 1102 The Profession of Pharmacy **2 QH**
Introduces pharmacy freshman students to the profession of pharmacy. Discusses pharmacist roles in health care delivery, pharmacy demographics, drug component of health care, pharmacy education, pharmacy law, ethics and professionalism, and professional pharmacy associations.

PHP 1301 Pharmaceutical Jurisprudence **4 QH**
Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq. Junior standing.*

PHP 1302 Pharmacy Administration 1 **4 QH**
Covers contemporary administrative aspects of pharmacy: trends in contemporary practice, third-party payment plans, macroeconomic impact on the profession, and the impact of current health care issues on pharmacy. *Prereq. Senior standing or permission of instructor.*

PHP 1303 Interpersonal Skills for Health Professionals **4 QH**
Applies the skills of interpersonal communication to situations encountered in various health care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings. *Prereq. Pharmacy and dental hygiene majors only.*

PHP 1314 Pharmacy Care Management **4 QH**
Focuses on the managerial and administrative skills required by a contemporary pharmacist practicing in either a community or hospital setting. Discusses classical management principles of planning, decision making, organizing, hiring, and controlling. Covers aspects of managing pharmacy business growth such as marketing, market research, advertising, pricing, reimbursement, resource utilization, and inventory control. Uses a case study method throughout as an interactive teaching tool. Incorporates in lectures and case materials current events in pharmacy, future characteristics of pharmacy practice, national health care, quality assurance, and risk management. *Prereq. Senior standing or permission of instructor.*

PHP 1401 Drug Information and Evaluation **3 QH**
Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand, interpret and evaluate the medical and pharmaceutical literature. *Prereq. Junior standing or permission of instructor.*

PHP 1402 Parapharmaceuticals **2 QH**
Focuses on the nature and application of various surgical devices, appliances, bandages, home health care products, and hospital and sickroom supplies and on monitoring equipment in the provision of pharmacy care. *Prereq. Senior standing.*

PHP 1411 Pathophysiology **4 QH**
Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq. PAH 1202, PAH 1204 or concurrent enrollment, and middler standing.*

PHP 1441 Therapeutic Drug Monitoring **4 QH**
Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq. PCT 1440 and junior standing.*

PHP 1501 Ambulatory Pharmacy Externship **4 QH**
Involves a 400-hour (10 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq. PHP 1301, PHP 1601, and PHP 1609.*

PHP 1503 Professional Practice Laboratory **1 QH**
Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of therapy. *Prereq. PHP 1301, PHP 1601, and PHP 1609.*

PHP 1505 Hospital Pharmacy Externship **4 QH**
Provides students with the learning experience needed to develop competency in the delivery of pharmacy services within a hospital setting. The student will receive information and hands-on experience in all phases of inpatient and outpatient dispensing; monitoring drug utilization; hospital committee activities; utilizing hospital reference material; and hospital managerial skills and procedures. *Prereq. PHP 1609 and senior standing. Taken at the same time as PHP 1506.*

PHP 1506 Clinical Pharmacy Clerkship **8 QH**
Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq. PHP 1609 and senior standing.*

PHP 1601 Nonprescription Medication **4 QH**
Provides an overview of the types of over-the-counter (OTC) medications. Discusses correct use precautions and adverse effects in a variety of patient populations. Addresses the issue of counseling different types of patients. *Prereq. Junior standing.*

PHP 1603 Selected Topics in Clinical Pharmacy 1 **4 QH**
Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq. Permission of instructor.*

PHP 1604 Selected Topics in Clinical Pharmacy 2 **4 QH**
Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq. Permission of instructor.*

PHP 1605 Introduction to Sterile Products **4 QH**
Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq. Junior or senior pharmacy majors only or permission of instructor.*

PHP 1607 Cancer Chemotherapeutics **4 QH**
Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq. Fourth-year pharmacy major or permission of instructor.*

PHP 1609 Pharmacotherapeutics **6 QH**
Examines the drug therapies of the major disease states. Covers selected cardiovascular, respiratory, hepatic, renal, and endocrine disorders. *Prereq. PCL 1420, PCL 1422, PCT 1440, PHP 1411, PMC 1419, PMC 1421, and junior standing.*

PHP 1612 Special Topics in Pharmacy Administration **2 QH**
Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq. Junior or senior pharmacy majors only.*

PHP 1614 Special Topics in Pharmacy Administration **4 QH**
Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq. Junior or senior pharmacy majors only.*

PHP 1615 Clinical Immunology **3 QH**
Reviews the fundamentals of basic immunology, including humoral and cell-mediated immunity, the major histocompatibility complex (MHC), and cytokines, then progresses to in-depth discussion of immunological diseases and disorders, including hypersensitivity, infectious disease, congenital and acquired immunodeficiencies including AIDS, cancer immunology, transplantation, and autoimmunity. Discusses various important immunotherapeutic modalities, including monoclonal antibodies, cytokines, and recombinant DNA technology products. *Prereq. PharmD student or permission of instructor.*

PHP 1801, PHP 1802, PHP 1803, PHP 1804 **4 QH each**
Special Research Project
Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq. Permission of instructor.*

PHP 1805 Special Research Project **3 QH**
Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq. Permission of instructor.*

PHP 1806 Special Research Project **2 QH**
Same as PHP 1805.

PMC 1322 Pharmaceutical Biotechnology **3 QH**
Introduces the principles of immunology and molecular biology and discusses their applications to the design, development, and use of biopharmaceuticals and to gene insertion therapies. Topics include small and large peptides, antibodies, and growth factors. *Prereq. PAH 1202 (or concurrent enrollment), PAH 1280, CHM 1269.*

PMC 1419 Medicinal Chemistry/Pharmacology 1 **5 QH**
Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, antipsychotics, and opioid analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq. BIO 1109, CHM 1269, PAH 1202, PAH 1204 (or concurrent enrollment), PAH 1280, and middler standing.*

PMC 1421 Antiinfectives **5 QH**
Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq. BIO 1121, PAH 1280, PMC 1419, and junior standing.*

PMC 1801, PMC 1802, PMC 1803 **4 QH each**
Special Research Project (Medicinal Chemistry)
Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor and program director.*

PMD 1501 Advanced Pathophysiology/Pharmacotherapeutics 1 **5 QH**
Examines the pathophysiology of major disease states as it relates to the development of a patient-oriented pharmacotherapeutic plan. Emphasizes the role of pathophysiology, etiology, clinical signs and symptoms, and diagnosis in the selection, initiation, and monitoring of therapeutic drug regimens. Allows students to develop skills in case evaluation by the application of lecture material to patient-specific cases through weekly seminars. Covers cardiology, nephrology, and hepatology. (Formerly PAH 3214.) *Prereq. PharmD students.*

PMD 1502 Advanced Pathophysiology/Pharmacotherapeutics 2 **5 QH**
Continues discussions introduced in PMD 1501. Covers infectious disease (module 1), pulmonary, neurology, nutrition, and gastrointestinal diseases. (Formerly PAH 3215.) *Prereq. PMD 1501.*

PMD 1503 Advanced Pathophysiology/Pharmacotherapeutics 3 **5 QH**
Continues discussions introduced in PMD 1501 and PMD 1502. Covers infectious disease (module 2), AIDS, pediatrics and neonatology, and obstetrics and gynecology. (Formerly PAH 3216.) *Prereq. PMD 1502.*

PMD 1511 Pharmacy Research and Evaluation **3 QH**
Covers aspects of experimental design and hypothesis testing. Uses critical reading of clinical trials, cohort and retrospective studies, and health services research articles to illustrate principles of research design and conduct. Students will be expected to complete a research protocol. (Formerly MHP 3102.) *Prereq. PharmD students.*

PMD 1512 Biometrics **2 QH**
Explores the fundamental principles of experimental design and statistical analysis, emphasizing biomedical research. Topics include probability distributions, descriptive statistics, hypothesis testing, correlation, regression, and chi-square testing. (Formerly MHP 3201.) *Prereq. PharmD students.*

PMD 1515 Pharmacoeconomics **3 QH**
Applies various pharmacoeconomic techniques to an analysis of drug therapy and other pharmacy-related issues. Examines the role of quality of life and therapeutic outcomes in pharmacoeconomic studies. Investigates the value of pharmacoeconomic studies *Prereq. PharmD students.*

PMD 1600 Institutional Experience **4 QH**
Provides experiential rotation in a contemporary institutional setting where students have the opportunity to further develop knowledge of and demonstrate pharmacy practice skills. Focuses on delivery of patient-oriented care, management and evaluation of pharmacy operations and medication distribution systems, and provision of additional professional services. (Formerly PAH 3330.) *Prereq. PMD 1503 and sixth-year PharmD student status.*

PMD 1601, PMD 1602, PMD 1603, PMD 1604 **9 QH each**
Clinical Clerkship 1,2,3,4
Provides experiential rotations in specialty areas of contemporary pharmacy practice where students can apply knowledge to delivery of patient care. Offers students the opportunity to demonstrate skills in areas of communication, critical thinking and problem-solving, and patient-oriented care through observation and performance. (Formerly PAH 3322–3325.) *Prereq. PMD 1503 and sixth-year PharmD student status.*

Physical Therapy

PTH 1001 Introduction to Physical Therapy and Cooperative Education **4 QH**
Offers a basic practical understanding of patient care procedures used in physical therapy practice, including body mechanics, therapeutic positioning, patient ambulation and transfer techniques, and range of motion exercises. Introduces physical therapy students to cooperative education and its implications for career planning in physical therapy. Covers self-assessment, resume writing, and interviewing skills.

PTH 1118 Developmental Basis of Human Performance **4 QH**
Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1202 Therapeutic Modalities in Physical Therapy Practice **3 QH**
Provides practice in preparing patients and equipment for various treatment procedures using physical agents. Includes theory, demonstration, and practice in applying heat and cold modalities, hydrotherapy, ultraviolet and laser light therapies, and electrotherapy. *Prereq. PTH 1001.*

PTH 1252 Clinical Gross Anatomy 1 **3 QH**
Covers the structure and function of the head, neck, and trunk regions of the human body with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems and clinical application to these systems. *Prereq. BIO 1162, BIO 1163, and BIO 1164.*

PTH 1253 Clinical Gross Anatomy 2 **3 QH**
Covers the structure and function of the extremities of the human body with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems and clinical application to these systems. *Prereq. BIO 1162, BIO 1163, and BIO 1164.*

PTH 1310 Clinical Gross Anatomy **6 QH**
Covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver prosection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq. BIO 1152, BIO 1153, and BIO 1154. AT students only.*

PTH 1316 Neuromuscular Physiology **4 QH**
An in-depth study of neuromuscular physiology, motor control, and motor learning, with applications to physical therapy practice. *Prereq. BIO 1152, BIO 1153, BIO 1154, and PTH 1202.*

PTH 1320 Soft Tissue Mobilization **2 QH**
Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq. BIO 1254, BIO 1255, and PTH 1202.*

PTH 1325 Clinical Medicine 1 **4 QH**
Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq. BIO 1152, BIO 1153, and BIO 1154.*

PTH 1330 Clinical Kinesiology **5 QH**
Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq. PTH 1310 and PTH 1316.*

PTH 1335 Musculoskeletal Evaluation **3 QH**
Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq. PTH 1310, PTH 1316, and PTH 1320.*

PTH 1341 Musculoskeletal Therapeutic Exercise **5 QH**
Explores the theory, planning, and practice of basic therapeutic exercise. Discusses musculoskeletal as well as basic cardiovascular principles. Offers the opportunity to apply principles from other professional courses to design treatment programs using a systematic, problem-solving approach. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1345 Orthopedic Clinical Medicine 2 **3 QH**
Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq. PTH 1310, PTH 1316, and PTH 1325.*

PTH 1352 Psychosocial Aspects of Illness **3 QH**
Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1356 Prosthetics **1 QH**
Studies theory, demonstration, and current practice in prosthetics. *Prereq. PTH 1316, PTH 1330, PTH 1335, PTH 1341, and PTH 1345.*

PTH 1360 Neurological Therapeutic Exercise **4 QH**
Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1361 Neurological Assessment and Adult Neurology **3 QH**
Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1366 Neuroanatomy **5 QH**
Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1370 Clinical Seminar **2 QH**
Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1380 Supervised Clinical Education 1 **5 QH**
Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1386 Pediatric Neurology **2 QH**
Focuses on the pediatric and neurologic aspects of physical therapy practice. Reviews symptoms, conditions, and therapeutic/medical intervention. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy **4 QH**
Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardio-pulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders and physical therapy management. *Prereq. Physical therapy students who have satisfactorily completed all prior professional courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.*

PTH 1392 Pathophysiology and Clinical Therapeutics **1 QH**
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1396 Pediatric Evaluation/Treatment **2 QH**
Explores evaluating and treating the motor aspects of the neuromuscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1400 Administration **4 QH**
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq. PTH 1380.*

PTH 1405 Research for Physical Therapy **4 QH**
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1411 Clinical Integration **4 QH**
Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis on rationale and selection of treatment alternatives. Uses case study format and case simulations. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1415 Supervised Clinical Education 2 **0 QH**
Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1416 Supervised Clinical Education 3 **0 QH**
Continues PTH 1415. Provides an additional clinical assignment which gives students the opportunity to further refine their clinical skills under the supervision of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq. Satisfactory completion of PTH 1415.*

PTH 1420 Physical Therapy in the Health Care System **3 QH**
Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq. PTH 1370 and PTH 1380.*

PTH 1426 Functional Aspects of Aging **3 QH**
Discusses the interaction of psychological, social and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq. PTH 1370 and PTH 1380.*

PTH 1453 Advanced Musculoskeletal Assessment and Treatment **3 QH**
Provides an opportunity to develop knowledge and skills in evaluating and treating joint dysfunction. Uses a problem-solving approach. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1602 Special Topics in Physical Therapy **2 QH**
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy **4 QH**
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct **1 QH**
Constitutes an addition to any three, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study **2 QH**
Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq. Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing **4 QH**
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Hearing Science **4 QH**
Presents basic concepts related to the physics of sound and an in-depth study of the anatomy and physiology of the normal hearing mechanism. Discusses basic principles of psychophysics of audition.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms **4 QH**
Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq. SLA 1101.*

SLA 1300 Language Acquisition **4 QH**
Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq. SLA 1101.*

SLA 1301 Phonetics **4 QH**
Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition. *Prereq. SLA 1101 and SLA 1201.*

SLA 1303 Introduction to Audiology **4 QH**
Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 1400 Speech Science **4 QH**
Offers an examination of the basic sciences involved in speech and audition. Includes an in-depth study of the analysis of sound and the acoustic composition of speech. Emphasizes review of current theory and research in speech reception, perception, and production.

SLA 1403 Clinical Procedures in Speech and Language **4 QH**
Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1460 Neurological Bases of Communication **4 QH**
Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study **4 QH**
Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that

approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

SLA Speech Pathology 1 **4 QH**
Presents models of developmental speech, language, and communication impairments. Includes such topics as specific language impairments, articulation/phonological disorders, dysfluency, and language-based learning problems. Stresses common clinical processes associated with the management of these and other disorders. *Prereq. SLA 1101, SLA 1201, SLA 1300, and SLA 1301.*

SLA Speech Pathology 2 **4 QH**
Focuses on organic and acquired speech, language, and communication disorders. Emphasizes clinical problem-solving for disorders such as voice, craniofacial anomalies, aphasia and related neurogenic disorders, and cerebral palsy. *Prereq. Speech Pathology 1 and associated prerequisites.*

SLA Clinical Procedures in Audiology **4 QH**
Familiarizes students with audiological procedures used in a variety of settings, including hospitals, clinics, and school systems. Covers case history, case reporting, and contemporary issues in audiology. Focuses on assessment and on habilitation/rehabilitation as it relates to audiometric interpretation. Requires observation of a wide variety of clinical cases. *Prereq. SLA 1101, SLA 1200, and SLA 1303.*

SLA Speech-Language Pathology and Audiology Services in the Schools **4 QH**
Covers assessment and intervention approaches by speech-language pathologists and audiologists in school settings. Addresses the impact of communication and hearing problems on academic performance and the interface between language abilities and reading and writing. Includes consideration of the assessment and management of learning disabilities, specific language impairment and central auditory processing disorders, and the increasing impact of these problems as children progress through the curriculum. Additional topics include metalinguistic skills, narrative and other scripted knowledge, the relationship of oral to written language, and discourse skills. Provides students with the opportunity to develop the ability to intervene with these populations using a classroom-based approach. Incorporates issues associated with classroom integration, the cultural bases of language differences, and team-based clinical management.

SLA Seminar in Speech-Language Pathology and Audiology **4 QH**
Focuses on advanced theoretical and clinical topics in speech-language pathology and audiology as they relate to issues associated with enrollment in an externship. Students are expected to present case studies and participate in problem-based learning situations as a means of facilitating critical thinking and problem-solving associated with clinical management. Presents various topical issues ranging from changes in the health-care environment to awareness and appreciation of cultural factors.

Toxicology

TOX 1100 Toxicology Orientation **1QH**
Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology **1 QH**
Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology **4 QH**
Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq. PMC 1418.*

TOX 1301 Fundamental Principles of Systemic Toxicology **4 QH**
Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq. PMC 1418.*

TOX 1302 Chemical and Analytical Toxicology **4 QH**
Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq. PMC 1418 and TOX 1301.*

TOX 1322 Biochemical Toxicology Laboratory **4 QH**
Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq. TOX 1300, TOX 1301, or TOX 1302.*

TOX 1811, TOX 1812, TOX 1813 Toxicology Research **4 QH each**
Students participate in faculty-directed research projects in the toxicology laboratory.

ROTC, Military Officers' Training Program

AIR 1110 Air Force Today 1 1 QH
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.

AIR 1111 Leadership Laboratory 1 1 QH
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.

AIR 1120 Air Force Today 2 1 QH
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.

AIR 1121 Leadership Laboratory 2 1 QH
Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.

AIR 1210 Development of Air Power 1 QH
Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914-1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.

AIR 1211 Leadership Laboratory 3 1 QH
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.

AIR 1220 Development of Air Power 1 QH
Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Students also begin five hours of introductory leadership. Continues emphasis upon student participation and presentations to enhance communicative skills.

AIR 1221 Leadership Laboratory 4 1 QH
Continues AIR 1211. Adds a special program in preparation for field training.

AIR 1310 Management and Leadership 1 4 QH
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.

AIR 1311 Leadership Laboratory 7 1 QH
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.

AIR 1320 Management and Leadership 2 4 QH
Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment. Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.

AIR 1321 Leadership Laboratory 8 1 QH
Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.

AIR 1410 United States National Security Forces 1 4 QH
Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.

AIR 1411 Leadership Laboratory 5 1 QH
Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.

AIR 1420 United States National Security Forces 2 4 QH
Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communicative skills through student presentation.

AIR 1421 Leadership Laboratory 6 1 QH
Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.

ARM 1100 Leadership Laboratory 1 0 QH
Introduces first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.

ARM 1101 Introduction to the Army 1.5 QH
Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style and physical fitness training.

ARM 1102 Basic Leadership 1.5 QH
Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.

ARM 1103 Basic Tactics 1.5 QH
Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.

ARM 1200 Leadership Laboratory 2 **0 QH**
Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering, rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship **1 QH**
Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Comparative Armies **1.5 QH**
Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard. Uses these concepts as building blocks to examine and compare armies currently affecting United States doctrine and tactics. Integrates the Soviet, Warsaw Pact, NATO , and other world forces into the course structure through the study and examination of current events inside and outside the military establishment.

ARM 1203 Health and Physical Fitness **1.5 QH**
Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1300 Leadership Laboratory **0 QH**
Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation **2 QH**
Presents advanced land navigation techniques to junior-year ROTC cadets. Introduces the topographic map and its commonly used symbols. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance on a map; and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training **2 QH**
Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic **2 QH**
Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5 **6 QH**
Provides external leadership lab conducted at Fort Bragg, North Carolina, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 123 colleges and universities from Maine to Florida. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4 **0 QH**
Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills **2 QH**
Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics **2 QH**
Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics **2 QH**
Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory **0 QH**
Focuses on either drill instruction or practical work to complement classroom instruction, Must be taken in each class quarter by all NROTC nursing students.

NAV 1101 Introduction to Naval Science **3 QH**

Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1202 Seapower and Maritime Affairs **3 QH**

Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Soviet naval strengths.

NAV 1401 Leadership and Management 1 **3 QH**

Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2 **3 QH**

Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to confidently assume the responsibilities of a commissioned officer in the United States Navy. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.

School of General Studies

ECN 4601 Economics 1 **4 QH**
Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

ED 4003 Integrated Language Skills **4 QH**
Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4004 Integrated Language Skills **4 QH**
Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. *Prereq. ED 4003.*

ED 4005 Integrated Language Skills Seminar **1 QH**
Provides students with necessary information for the transition from freshman to sophomore status. Topics include personal, academic, and career goal setting, workplace market forces, selecting a major, and issues related to achieving sophomore status. Gives students the opportunity to explore a variety of career options both through library research and through interviews. *Prereq. ED 4004.*

ENG 4013 Fundamentals of English 1 **4 QH**
Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.

ENG 4014 Fundamentals of English 2 **4 QH**
Presents intensive instruction in exposition, argument, and academic essay writing and includes instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments.

HST 4110 History of Civilization A **4 QH**
Covers the major ideas and institutions of civilization from ancient times to 1648.

HST 4111 History of Civilization B **4 QH**
Continues HST 4110, covering the period since 1648.

MGT 4110 Survey of Business and Management **4 QH**
Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organization, and the functions of management in the context of their influence on the various forms of business. Through lecture and class discussion, the student gives an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

MTH 4000 Mathematical Preliminaries 1 **4 QH**
Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.

MTH 4010 Mathematical Preliminaries 2 **4 QH**
Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, factoring, linear equations, graphing, and radicals. For students whose background in algebra is weak.

MTH 4020 Functions and Algebra **4 QH**
Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Discusses some elementary trigonometry and vectors in the plane.

MTH 4030 Basic Algebraic Applications **4 QH**
Examines systems of linear equations and their graphs. Focuses on graphic systems of linear inequalities in two variables that apply to linear programming. Introduces matrices, matrix multiplication, and vectors. *Students do not receive credit for MTH 1101 if they have already received credit for MTH 1113.*

MTH 4040 College Mathematics for Business **4 QH**
Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, compound interest, and annuities.

POL 4106 Introduction to Politics **4 QH**
Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system.

SOC 4010 Principles of Sociology 1 **4 QH**
Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

SOC 4011 Principles of Sociology 2 **4 QH**
Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change.

— According to results of diagnostic tests, SGS students also enroll in designated sections of several Full-Time Day Program courses in the spring quarter.

English as a Second Language

ESL 1011 Beginning Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for basic-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1012 Low-Intermediate Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for low-intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1013 Intermediate Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1014 High-Intermediate Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for high-intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1015 Advanced Core-Structure and Communication **0 QH**
Focuses on listening, speaking, note-taking, and presentation skills with selective grammar review for advanced-level students. Targets skills for academic success in the University. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1021 Beginning Reading **0 QH**
Provides guided reading practice to basic-level students. Uses materials designed for students with limited vocabulary and knowledge of English. Focuses on vocabulary development and comprehension of short passages. Encourages active participation and discussion.

ESL 1022 Low-Intermediate Reading **0 QH**
Provides reading practice to intermediate-level students. Introduces strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing. Targets vocabulary development. Encourages discussion based on the readings.

ESL 1023 Intermediate Reading **0 QH**
Provides reading practice to intermediate-level students. Covers strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing. Targets vocabulary development. Encourages discussion based on the readings.

ESL 1024 High-Intermediate Reading **0 QH**
Provides reading practice to high-intermediate-level students. Applies strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing through intensive and extensive reading of a variety of texts: fiction, autobiography, articles of general interest, and selections from university-level textbooks. Continues development of vocabulary. Encourages discussion based on the readings.

ESL 1025 Advanced Reading **0 QH**
Provides reading practice to advanced-level students. Applies strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing through intensive and extensive reading of a variety of texts: fiction, autobiography, articles of general interest, and selections from university-level textbooks. Continues development of vocabulary. Encourages discussion based on the readings.

ESL 1031 Beginning Composition **0 QH**
Focuses on paragraph development for beginning students with limited grammar and vocabulary. Provides practice with punctuation, spelling, capitalization, and topic and supporting sentences.

ESL 1032 Low-Intermediate Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for low-intermediate students. Focuses on writing well-organized and effectively developed paragraphs.

ESL 1033 Intermediate Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for intermediate students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1034 High-Intermediate Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for high-intermediate students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1035 Advanced Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for advanced students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1044 High-Intermediate Listening/Speaking-Pronunciation **0 QH**
Focuses on aspects of English pronunciation, including the sounds of vowels and consonants, as well as the patterning of stress and intonation, that aid non-native speakers in speaking intelligibly in English. Develops active listening strategies to improve comprehension. Provides a variety of speaking activities and directed laboratory practice.

ESL 1045 Advanced Listening/Speaking **0 QH**
Explores techniques of effective oral communication and provides opportunities for extensive practice. Develops active listening strategies to improve comprehension and provides opportunities for additional, self-directed study in the listening and video labs.

ESL 1054 High-Intermediate Intensive Grammar **0 QH**
Provides extensive practice and review of major grammatical points with the aim of increasing command of the structures of English and improving writing skills.

ESL 1090 Business Language Skills (Advanced) **0 QH**
Serves as a preparatory course using business cases for non-native-speaking professionals and graduate students entering American MBA programs. Focuses on presentation skills and strategies for participation in bargaining sessions; participants receive practice in writing business case analyses, performance appraisals, reports, and team business plans.

ESL 1091 TOEFL Preparation **0 QH**
A 10-week course. Provides extensive training and practice in test-taking techniques for the TOEFL. Focuses on improving scores with practice tests in grammar, listening, and reading. Includes preparation for the Test of Written English. Institutional TOEFL given every five weeks.

ESL 1092 TOEFL Preparation **0 QH**
A five-week course. Provides extensive training and practice in test-taking techniques for the TOEFL. Focuses on improving scores with practice tests in grammar, listening, and reading. Includes preparation for the Test of Written English. Institutional TOEFL given every five weeks.

ESL 1093 TOEFL Preparation **0 QH**
A five-week course. Provides extensive training and practice in test-taking techniques for the TOEFL. Focuses on improving scores with practice tests in grammar, listening, and reading. Includes preparation for the Test of Written English. Institutional TOEFL given every five weeks.

Appendix

Campus Map


Boston
Massachusetts
Back Bay Fens
400 The Fenway
FENWAY
Museum of Fine Arts
FORSYTH WAY
HEMENWAY STREET
GAINSBOROUGH STREET
Symphony Road
WESTLAND AVENUE
Christian Science Church Center
Horticultural Hall
Symphony Hall
NORTH PARKING AREA
SPEARE PLACE
ST. STEPHEN STREET
OPERA PLACE
HUNTINGTON AVENUE
YMCA
New England Conservatory of Music
ST. BOTOLPH STREET
ARENA PARKING AREA
MASSACHUSETTS AVENUE
MASS. AVE. STATION
PARKER STREET
TAVERN PARKING AREA
Tavern Road
FORSYTH STREET
ROBINSON PARKING AREA
LEON PARKING AREA
Leon Street
Field Street
FIELD STREET PARKING NO. 1
FIELD STREET PARKING NO. 2
CENTENNIAL COMMON
RUGGLES STREET
RYDER PARKING AREA
RUGGLES ST. STATION
MBTA
VISITOR/PAY PARKING
CAMDEN PARKING AREA
Camden Street
Northampton Street
PARKING GARAGE
ENTRANCE
Carter Playground
COLUMBUS PARKING AREA
COLUMBUS AVENUE
EXIT
DAVENPORT PARKING NO.1
DAVENPORT PARKING NO.2
Davenport Street
Douglass Park
Berkeley Street
Burke Street
Coventry Street
Cunard Street
TREMONT STREET
TREMONT PARKING AREA
MELNEA CASS BOULEVARD

Academic and Service Buildings

22 John D. O'Bryant African-American Institute (AF)
12 Barletta Natatorium (BN)
19 Boiler Plant
11 Cabot Physical Education Building (CB) TTY: Rm 110
39 Cahners Hall (CA) TTY: Rm 151
28 Cargill Hall (CG)
13 Churchill Hall (CH)
62 Classroom Building (CL)
59 Columbus Place (716 Columbus Avenue) (CP)
9 Cullinane Hall (CN)
4 John A. and Marcia E. Curry Student Center (Student Lounge) (SC) TTY: Rm 255
40 Cushing Hall (CU)
14 Dana Research Center (DA)
27 Dockser Hall (DK) TTY: Rm 107
Dodge Hall (DG)
61 Maureen and Richard J. Egan Engineering/Science Research Center
3 Ell Student Building (Auditorium) (EL) TTY: Rms 04,104
56 Field Street (FS)
16 Forsyth Building (FR) TTY: Rms 100, 135
17 Forsyth Building Annex (FA)
38 Forsyth Dental Building (FE)
1 Hayden Hall (HA) TTY: Rms 120, 202
33 Hillel-Frager (HF)
24 Holmes Hall (HO) TTY: Rm 276
55 236 Huntington Avenue (HU)
10 Hurtig Hall (HT)
26 Kariotis Hall (KA)
41 Kerr Hall (Faculty Center) (KH)
29 Knowles Center (KN)
25 Lake Hall (LA) TTY: Rm 203
63 Roger M. and Michelle S. Marino Recreation Center
57 Matthews Arena (MA)
58 Matthews Arena Annex (MX)
20 Meserve Hall (ME) TTY: Rm 305
5 Mugar Life Science Building (Peabody Health Professions Center) (MU)
18 Nightingale Hall (NI) TTY: Rm 125
31 Parker Building (PA)
2 Richards Hall (RI) TTY: Rms 150, 254
8 Robinson Hall (RB)
21 Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
15 Snell Engineering Center (SN) TTY: Rm 120
60 Snell Library (SL) TTY: Reference Desk
50 122 St. Stephen Street (SS)
30 Stearns Center (ST) TTY: Rm 302
32 26 Tavern Road (TA)

Residence Buildings

34 Burstein Hall
43 Kennedy Hall
46 142–148 Hemenway Street
45 153 Hemenway Street and Loftman Hall
7 316 Huntington Avenue (Northeastern at the YMCA)
52 319 Huntington Avenue
51 337 Huntington Avenue
36 407 Huntington Avenue
41 Kerr Hall
53 Light Hall
45 Loftman Hall and 153 Hemenway Street
42 Melvin Hall
35 Rubenstein Hall
44 Smith Hall
49 Speare Hall
48 Stetson East TTY (public)
47 Stetson West
50 106/110/116/122 St. Stephen Street
23 Willis Hall
37 White Hall
54 400 The Fenway

Key

Academic, residential, and service buildings

Handicap parking

Accessible routes

Parking areas

Street direction

Underground tunnel

Emergency telephone

TTY locations
See alphabetic list of buildings for **TTY** locations.

TTY: Rm 000

Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 5/96

Academic Calendar 1997–1998

1997

August	29–Sept. 12	Friday–Friday	Divisions A and Z vacation.
September	1	Monday	**Labor Day.** University closed.
	11	Thursday	**Fall Commencement.**
	12–16	Friday–Tuesday	Orientation and registration for freshmen and transfer students.
	15	Monday	Upperclass registration (Divisions A and Z) 1 PM.
	17	Wednesday	Classes begin in undergraduate full-time day programs.
October	13	Monday	**Columbus Day.** University closed.
November	11	Tuesday	**Veterans Day.** University closed.
	27	Thursday	**Thanksgiving Day.** University closed.
	27–29	Thursday–Saturday	**Thanksgiving** recess. University closed except key offices.
December	5–11	Friday–Thursday	Fall final examinations for undergraduate full-time day programs.
	12–Jan. 2	Friday–Friday	**Christmas** vacation. University closed except key offices.

1998

January	1	Thursday	**New Year's Day.** University closed.
	5–6	Monday–Tuesday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students (Divisions B and Y).
	7	Wednesday	Classes begin in undergraduate full-time day programs for winter quarter.
	19	Monday	**Martin Luther King Jr.'s Birthday** observed. University closed.
February	16	Monday	**Presidents' Day.** University operates on a normal class schedule.
March	16–20	Monday–Friday	Winter final examinations for undergraduate full-time day programs.
	23–27	Monday–Friday	Divisions B and Y vacation.
	30–31	Monday–Tuesday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students (all seniors and Divisions A and Y).
April	1	Wednesday	Classes begin in undergraduate full-time day programs for spring quarter.
	20	Monday	**Patriots' Day.** University operates on a normal class schedule.
May	25	Monday	**Memorial Day.** University closed.

June	8–12	Monday–Friday	Spring final examinations for undergraduate full-time day programs.
	15–19	Monday–Friday	Divisions A and Y vacation.
	20	Saturday	**Commencement.**
	22	Monday	Registration for Divisions B and Z and January freshmen (Quarter 3).
	23	Tuesday	Classes begin in undergraduate full-time day programs for summer quarter.
July	4	Saturday	**Independence Day.** University closed.
August	31–Sept. 3	Monday–Thursday	Summer final examinations for undergraduate full-time day programs.
September	4–18	Friday–Friday	Divisions B and Z vacation.
	7	Monday	**Labor Day.** University closed.
	17	Thursday	**Fall Commencement.**
	18–22	Friday–Tuesday	Beginning of 1998–1999 academic year. Orientation, advising, and registration continues for new students and returning Divisions B and Z.
	23	Wednesday	Classes begin in undergraduate full-time day programs for fall quarter.

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

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The *Northeastern University Undergraduate Catalog (Full-Time Day Programs)* contains the University's primary statements about these academic programs and degree requirements, as authorized by the president or the Board of Trustees. For information about other academic policies and procedures; student responsibilities; student academic and cocurricular life; faculty rights and responsibilities; or general personnel policies, benefits, and services, please refer to the *Academic Operations Manual, Undergraduate and Graduate Student Handbook, Cooperative Education Handbook, Faculty Handbook, Benefits and Services Handbook,* and related procedural guides, as appropriate.

Accreditation. Northeastern University is accredited by the New England Association of Schools and Colleges, Inc.

Delivery of Services. Northeastern University assumes no liability for delay or failure to provide educational or other services or facilities due to causes beyond its reasonable control. Causes include, without limitation, power failure, fire, strikes by University employees or others, damage by natural elements, and acts of public authorities. The University will, however, exert reasonable efforts, when it judges them to be appropriate, to provide comparable services, facilities, or performance; but its inability or failure to do so shall not subject the University to liability.

The *Northeastern University Undergraduate Catalog* contains current information about the University calendar, admissions, degree requirements, fees, and regulations; however, such information is not intended and should not be regarded to be contractual.

Northeastern University reserves the sole right to promulgate and change rules and regulations and to make changes of any nature in its program; calendar; admissions policies, procedures, and standards; degree requirements; fees; and academic schedule whenever necessary or desirable, including, without limitation, changes in course content and class schedule, the cancellation of scheduled classes and other academic activities, and the substitution of alternatives for scheduled classes and other academic activities. In any such case, the University will give whatever notice is reasonably practical.

Northeastern University will endeavor to make available to its students a fine education and a stimulating and congenial environment. However, the quality and rate of progress of an individual's academic career and professional advancement upon completion of a degree or program are largely dependent on his or her own abilities, commitment, and effort. In many professions and occupations, there are also requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These requirements may change while a student is enrolled in a program and may vary from state to state or country to country. Although the University stands ready to help its students find out about requirements and changes in them, it is the student's responsibility to initiate the inquiry.

Tuition Default Policy. In cases where the student defaults on his/her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the University, including attorneys' fees.

Emergency Closing of the University. Northeastern University has made arrangements to notify students, faculty, and staff by radio and television when it becomes necessary to cancel classes because of extremely inclement weather. AM stations WBZ (1030) and WRKO (680), and FM stations WBUR (90.9), WBMX (98.5), and WFNX (101.7) are the radio stations authorized to announce the University's decision to close. Television stations WBZ-TV4, WCVB-TV5, and WHDH-TV7 will also report cancellations. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operates when the University is closed. Please listen to the radio or television to determine whether the University will be closed.

If a storm occurs at night, the announcement of University closing is given to the radio stations at approximately 6 AM. Classes are generally canceled for that entire day and evening at all campus locations unless stated otherwise. When a storm begins late in the day, cancellations of evening classes may be announced. This announcement is usually made between 2 and 3 PM.

Equal Opportunity Policy. Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual orientation, age, national origin, disability, or veteran status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to:

Office of Affirmative Action
175 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-373-2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, U.S. Department of Education, J.W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

Family Educational Rights and Privacy Act. In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the *Undergraduate and Graduate Student Handbook* and are distributed annually at registration for the University's colleges and graduate schools.

Persistence Rates under the Student Right-to-Know Act. In the fall of 1996, the persistence rate for students who entered in the Fall 1995 cohort was 75.2 percent.

Mission Statement. Northeastern University is dedicated to providing a diverse student population with an academic program and a course of professional preparation of the highest quality. The University values equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction. As a private, urban university, Northeastern is determined to maintain its reputation as a friend to the city of Boston and a partner of the Commonwealth of Massachusetts.

Northeastern University Publications
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Northeastern University

UNDERGRADUATE CATALOG
FULL-TIME DAY PROGRAMS

1998-1999



NORTHEASTERN

Northeastern University

Undergraduate Catalog
Full-Time Day Programs

1998–1999

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The University

Admission

Learning about Northeastern

The Office of Undergraduate Admission encourages prospective students to learn more about Northeastern University. For more information on the following services and events, or to receive additional publications, contact the office at 617-373-2200 (voice), 617-373-3100 (TTY), or 617-373-8780 (fax). Or write: Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115. You may also access our Home Page on the Internet at http://www.neu.edu.

Information sessions. Sessions are scheduled at 10:00 AM and 2:00 PM, Monday through Friday, year-round (except for legal holidays). They include presentations by an admission counselor, an informal question-and-answer period, and a multimedia presentation. Sessions are also held on Saturday mornings from September through June.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admission counselor and to learn more about the University's academic and cooperative education programs. A sign language interpreter can be arranged with advance notification.

Guided tours. Campus tours, led by undergraduate guides, offer students a unique perspective on the Northeastern experience. Visitors observe campus life firsthand and talk with students as they tour academic, residence, and recreation areas. During the fall, winter, and spring, tours are conducted on the hour from 9:00 AM to 3:00 PM, Monday through Friday, and on Saturday mornings at 9:00, 10:00, and 11:00 AM; during the summer, tours are scheduled on the hour from 9:00 AM to 3:00 PM, Monday through Friday. All tours leave from the Admissions Office, 139 Richards Hall. Special tours for prospective students interested in the University Honors program are offered at 12:00 noon on Thursdays in the months of February, March, and April. These tours terminate in the Honors Program Office, where detailed information is available about Honors Program criteria, courses, and activities. As with general tours, no reservations are required.

Open houses. During the fall, late winter, and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admission, cooperative education, student financial services, residential life, student activities, and the University libraries, among other areas.

Admission Policies

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Modified rolling admission. Decisions on admission to all majors except physical therapy (see below) are made using a modified rolling admission plan, with decisions announced from December 1 to May 1 for those applying for the following fall quarter. Applications are considered complete only if they are accompanied by all required credentials (including first marking-period senior grades and Scholastic Assessment Test [SAT] of the College Board or American College Testing [ACT] test scores). In all cases of acceptance, candidates must complete their senior year of high school and submit final transcripts as proof of graduation. Admission is selective, and priority is given to candidates who apply by March 1. Most decisions are rendered before May 1. Candidates for physical therapy are admitted for fall quarter only, and must apply by the preceding February 1 for priority consideration.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before graduating from high school. Such students may enroll in September, thereby reducing by one year the time to complete degree requirements. The endorsement of the student's school principal or guidance counselor is required for early admission.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe in writing the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work. Students granted deferred admission will be required to place a $200 tuition deposit to secure their position.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of $200 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their letter of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students requesting on-campus housing must submit a nonrefundable $400 deposit (in addition to the $200 tuition deposit) along with a completed housing application. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students.

Entrance Requirements

Applicants must have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Assessment Test (SAT) or American College Testing Program (ACT) test results, weighs most heavily in the evaluation process.

Secondary School Preparation

Applicants to *all* University majors are expected to have completed the equivalents of four years of high school English, two years of a single foreign language, three years of mathematics (mandated as algebra 1, algebra 2, and geometry), two years of natural science with labs, and one year of a single unit or combined units in the area of social sciences. Further requirements for specific University majors are outlined below.

Business administration. Candidates must have completed a strong college preparatory program with four years of mathematics, including geometry, algebra 1, algebra 2, and a fourth year of trigonometry and/or analysis.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, (except physical therapy; see below), ***and other sciences.*** Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence should include two years of study and laboratory work in the subject areas of biology, chemistry, and physics. Engineering students are strongly recommended to complete high school physics. In mathematics, applicants must have completed a strong college preparatory program with four years of mathematics including geometry, algebra 1, algebra 2, and a fourth year of trigonometry and/or analysis.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, algebra 1, algebra 2, and analysis; and a full year of study and lab work in a natural science. Candidates also need courses in the social sciences and humanities.

Physical therapy. Candidates must have completed a full year each of biology and chemistry, with labs. However, due to the competitiveness of the program, it is strongly recommended that applicants also complete a year of physical science and a fourth year of science with lab (such as physics, advanced biology, advanced chemistry, or anatomy and physiology). In math, candidates must have completed geometry, algebra 1, algebra 2, and a fourth year of trigonometry and/or analysis.

Entrance Examinations

Freshmen must take the Scholastic Assessment Test (SAT) of the College Board or the American College Testing (ACT). Results of these tests may be sent directly to the Admission Office. The College Board code number for Northeastern University is 3667. When evaluating candidates' SAT scores, the Admission Office will combine the best verbal and math components, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540, or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

It is recommended that candidates for physical therapy take one SAT II subject test in either biology, chemistry, or mathematics.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing an approved English-as-a-second-language (ESL) course of study, or by receiving B– or above in non-ESL English courses in English-speaking high schools.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the TOEFL (or its equivalent on another examination) must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations in the areas of art (history, studio—general, studio—drawing), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus—Horace), music (theory), and Spanish (language, literature). Advanced placement credit is granted for scores of 4 or better in the areas of biology, chemistry, computer science (A, AB), mathematics (calculus AB, BC), and physics (BC mechanics—C electricity, magnetism).

College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program to evaluate nontraditional college-level education. Northeastern will grant college credit to qualified students according to their CLEP scores. Northeastern is a designated CLEP Testing Center. For more information, contact the Counseling Center at 302 Curry Student Center, 617-373-2142.

Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance to Northeastern. Completion of this form is considered a condition of enrollment. Each student must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titre are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. A positive titre for Hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply

All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable $40 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker.
- Mail the application form and the check to the Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Assessment Test (SAT) or American College Testing Program (ACT)—to be sent to the University. Transfer students who have completed 36 or more quarter hours of transfer credit are not required to submit test scores.
- For priority consideration, applications should be submitted by March 1; applications for the physical therapy major must be submitted by February 1.
- All materials submitted in conjunction with a student's application become the property of Northeastern University.

International Students

The University welcomes qualified students from other countries. At present, nearly 2,400 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs. The University also welcomes non-matriculated students who wish to improve their English skills by studying at the English Language Center for one or more quarters. The English Language Center also offers counseling and assistance to international students who decide to apply to Northeastern. Admission is contingent upon meeting all University requirements.

In addition to the application process described above, international students must complete the following:

- Submit the Supplementary Form with the application.
- Submit the Declaration and Certification of Finances Form with the application.
- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed and/or provide an official evaluation by an accredited agency.
- Request the testing agency to submit the official results of the Test of English as a Foreign Language (TOEFL). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. A student who attends and successfully completes the course of study offered by Northeastern University English Language Center (ELC) and obtains a "Pass" or a "Release" from the ELC is not required to submit TOEFL scores.
- Request the testing agency to submit the official results of the Scholastic Assessment Test (SAT). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. An applicant who has successfully completed 36 or more quarter hours is not required to submit SAT scores.

- After acceptance, submit the required nonrefundable tuition deposit of $200. Upon receipt of the tuition deposit, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in a regionally accredited college, university, or technical institute or who have earned an associate's degree from a regionally accredited two-year college or other two-year program may seek admission as an upperclass student.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four quarter hours. Students who successfully complete 48 quarter hours generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have or will have completed 36 or more quarter hours of transfer credit. In addition, transfer candidates must

- indicate their choice of college and major on the application; transfers may not request admission to physical therapy.
- request that an official copy of their high school transcript and/or General Equivalency Diploma (GED) test scores be sent to the Office of Undergraduate Admission
- request that an official transcript from each college attended be sent to the Office of Undergraduate Admission directly from the registrar's office of the respective colleges
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course)
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement

Transfer candidates should apply by March 1 for priority consideration. Applications will be reviewed on a space-available basis.

Cooperative Education

Robert E. Vozzella, EdD, *Vice President*
Kristin R. Woolever, PhD, *Interim Dean*
Candace A. Herene, BA, *Assistant Dean*
Patricia A. Venter, BS, *Diversity Coordinator*

Associate Professors
Betsey W. Blackmer, PT, EdD
Richard L. Canale, MEd, CAGS
Elizabeth A. Chilvers, MEd
Kathleen L. Finn, EdD, RN
Joyce K. Fletcher, MEd, DBA
Ann M. Galligan, EdD
Stephen M. Kane, EdD
John A. Saltmarsh, PhD
Melvin W. Simms, EdD
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Assistant Professors
Michael A. Ablove, MEd
Donald L. Eastridge, MDiv
Veronica L. Porter, MEd
William A. Sloane, MBA

Associate Cooperative Education Coordinators
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Terry H. Chapman, PhD
Jacqueline Diani, MEd
Rosemarie DiMarco, MS
Ellen Duwart, MEd
Jean F. Egan, MEd
Theresa A. Harrigan, EdD
Karen P. Kelley, MEd
Barbara E. Lechner, MEd
Kellianne Murphy, MA
Jacqueline F. Sweeney, MS
Nancy Waggner, JD
Martha L. Wengert, MEd
Felicia P. Wiltz, MEd
William E. Wray, JD
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Assistant Cooperative Education Coordinators
Robert J. Blaser, RPh, MS
Alicia A. Canali, MEd
Jeffrey A. Doughty, BS
Mark Erickson, MEd
Mary Jane Grusemeyer, MS
Karen L. Nelson, MArch
Catherine A. Riley, MA
Behrooz (Barry) Satvat, PE, ScD
Scott Weighart, MBA
Francis M. Williams, MEd
Stephen Williams, JD

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For most programs, cooperative education is a degree requirement. The University assists in providing relevant cooperative education experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and employers.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom study. Co-op students have opportunities to evaluate career decisions early in their college years, while gaining meaningful work experience before graduation and establishing valuable professional contacts and references. Students also earn experiential learning credit by satisfactorily completing the required components of the cooperative education learning process, and the salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Participation in co-op is required of all students except those in the College of Arts and Sciences. Even so, most arts and sciences students nonetheless choose to take advantage of co-op.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science also offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with cooperative education faculty who assist students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as traveling abroad, doing volunteer work, or taking specialized courses at another institution.

International Cooperative Education

The Department of International Cooperative Education offers a variety of services to international students as well as to U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, New Zealand, and Israel for students who have the appropriate background and experience.

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries to work for American and national companies on co-op, especially those countries located in the Pacific Rim region.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Summer Orientation

Undergraduate students entering the University in the fall quarter will participate in summer orientation. This required program is a valuable opportunity to prepare for a successful academic career at Northeastern University. During the months of July and August, new students and transfer students will attend a selected orientation session designed to meet their particular needs. Several of the sessions are designated for new students; others are designated for transfer students. Each of Northeastern's schools and colleges is assigned to specific sessions. Participants will attend a session hosted by the school or college to which they have been admitted.

The summer orientation staff includes orientation leaders, students who will serve as valuable sources of information and assistance throughout the program. In addition to the orientation leaders, staff and faculty from various campus offices and your school or college will be available to answer questions and to provide assistance in making arrangements for the fall. During summer orientation, participants will complete placement exams, meet with representatives from their school or college to develop a fall class schedule, register for classes, and obtain a student identification card. Participants will also learn about life at Northeastern, including services and opportunities that will assist with their transition to the University. In addition, participants will be able to contract for meal plans and complete arrangements for campus housing. The schedule also includes opportunities to tour the campus and participate in activities with other students. Student participants will stay in a campus residence hall during summer orientation. Parents/family will participate in a separate but parallel program and will also be invited to stay in a campus residence hall during this session. Registration information will be mailed to incoming students who have paid their tuition deposit. See page 17 for summer orientation fee information.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 AM to 5:10 PM, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform the dean of students and his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement that he/she may have missed because of such absence on any particular day; provided, however,

that such make-up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

Fall, Winter, and Spring Schedule

	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTTh	1:35–2:40
	Sequence 5	MTTh	2:50–3:55
	Sequence 6	MTTh	4:05–5:10
	Sequence 7	TF	8:00–9:05
		W	1:35–2:40
	Sequence 8	TF	9:15–10:20
		W	2:50–3:55
	Sequence 9	TF	10:30–11:35
		W	4:05–5:10
	Sequence 10	TWF	11:45–12:50
Business Students	Sequence A	MW	8:00–9:40
	Sequence B	W	1:45–3:25
		F	8:00–9:40
	Sequence C	MW	9:55–11:35
	Sequence D	TF	11:45–1:25
	Sequence E	TTh	1:45–3:25
	Sequence F	W	3:30–5:10
		F	9:55–11:35
	Sequence G	TTh	3:30–5:10
	Sequence H	M	3:30–5:10
		F	1:45–3:25
	Sequence I	M	1:45–3:25
		W	11:45–1:25
	Sequence J	TTh	9:55–11:35
	Sequence K	TTh	8:00–9:40

Summer Schedule

	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTh	11:45–12:50
		W	1:00–2:05
	Sequence 5	MTh	1:00–2:05
		W	2:15–3:20
	Sequence 6	MTh	2:15–3:20
		W	3:30–4:35
Business Students	Sequence A	MW	8:00–9:40
	Sequence B	MW	9:55–11:35
	Sequence C	TTh	8:00–9:40
	Sequence D	TTh	9:55–11:35
	Sequence F	M	1:45–3:25
		W	2:15–3:55
	Sequence G	TTh	11:45–1:25
	Sequence H	TTh	1:45–3:25
	Sequence I	TTh	3:30–5:10

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:25 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of Student Affairs or to the Student Government Association.

Grading System

Grades are officially recorded by letters, evaluated as follows.

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A–	3.667	
B+	3.333	
B	3.000	Good achievement
B–	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C–	1.667	
D+	1.333	
D	1.000	Poor achievement
D–	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
X		Incomplete in a pass/fail course
NE		Not enrolled. Did not attend after the date of record, the start of the second full week.
IP		Course in progress. Intended for courses such as Senior Thesis or a project that extends over several quarters. An IP can be replaced by a regular grade with a standard change-of-grade card. The time restrictions on the I grade do not apply to the IP grade. While unchanged, it is not included in computing the GPA. If never changed, the course does not count toward graduation requirements.

An I or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, S, and U are not included in the calculation of the quality-point average.

Credit hours. Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the dean's office of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.

- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.
- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Quarterly status reports. Grades are mailed to students approximately three days after each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor. Take up the matter of a missing or erroneous grade directly with the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C–. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Procedure for clearing an I or changing other grades. An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and will be billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1986, the University policy has been that any grade outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Students can make up failures by repeating the same course in the full-time day program. Both grades remain on the transcript but only the new grade is used for calculation of quality-point average. With permission from their dean's office, students may substitute an appropriate different course taken in the full-time day program or elsewhere. Credits earned elsewhere, including University College, are treated as transfer credits. Grades below C are not accepted for transfer credit.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board and the student information kiosks. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the Office of the Registrar, 120 Hayden Hall, but only if reported before the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed postcard with the final examinations in order to receive grades early.

Academic Progression Standards

Each college establishes academic progression standards for its own undergraduate students. To progress from one academic year to the next, students must meet the minimum quality-point average(s) (QPAs) and number of earned quarter hours required by their college/program. In addition, many programs require that specific courses be successfully completed to progress to the next year. Students who do not make satisfactory progress will not graduate with their class and may be withdrawn. For more information about academic progression standards for each college, program, or major, please refer to curriculum guidelines, which can be found either in individual college guidebooks or in the college sections of this *Undergraduate Catalog*, starting on page 26.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor and selection as the class marshal (June only) are reserved for students who have been registered at Northeastern University for at least seventy-two quarter hours.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (*cum laude*)
3.50–3.74	Graduation with high honor (*magna cum laude*)
3.75–4.00	Graduation with highest honor (*summa cum laude*)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Freshmen and upperclass students should consult the office of the dean of the college to which they want to transfer. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space. Deadlines are at the discretion of the colleges.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of sixteen quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middlers, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload policies. Inasmuch as withdrawal from a course can be accomplished up to the eighth week, no rebate or credit is granted when a student voluntarily drops a course. An exception can be made if the withdrawal takes place during the first week, but a student should raise the issue at that time.

Students who enroll in overload courses will be billed at the overload rate, 1/16 of the tuition for that quarter, per quarter hour.

Any upperclass student taking a full course load may elect to take an additional enrichment course without charge. No credit is given for this course. The procedure for taking this course is as follows: Confer with your dean or his or her designee to establish eligibility under the conditions that this course will be a four-quarter-hour basic college course; be the only such tuition-free course permitted during the upperclass academic year; be in addition to the normal course load for the quarter; be on a space-available basis on registration day, with priority given to tuition-paying students; not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours.

Should you later petition to have credits earned in this course apply to your degree, you must: (a) obtain the approval of your dean or his or her designee; (b) pay tuition at the rate current at the time of petition; and (c) complete the process by May 1 of your senior year. After you and the dean or his or her designee have filled out and signed the necessary form, take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Division conflicts. Students who are in the wrong division for a given quarter will be purged from all preregistered courses for that quarter unless their division assignment is correct one month prior to the start of that quarter. Students must contact their college dean's office and/or Cooperative Education to correct their status.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean or the department that offers the course. After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Registrar, Bursar, or Financial Aid promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the transcript office at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone and fax requests are not accepted, and no transcripts can be faxed from the University. Currently enrolled students can obtain unofficial transcripts in person from the student information kiosks located around campus. Students not currently enrolled can obtain an unofficial transcript in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Students should contact the office of the dean of their college. Students wishing to transfer should consult the dean's office for their school or the Office of Student Affairs.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from coursework (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

Northeastern University is eager to assist you in developing a plan for financing a Northeastern education. Through a variety of options—financial aid, supplemental loans, Northeastern's Monthly Payment Plan, and your own resources—a plan can be designed that will make your education costs affordable.

Financial Aid
For many families, financial aid is a major element in making Northeastern University affordable. The Office of Student Financial Services provides a full range of options that help undergraduate and graduate students finance their educations. To take advantage of Northeastern's financial aid programs, freshmen must submit the FAFSA and PROFILE forms and upperclass students must submit the FAFSA and NU Upperclass Application. For more information, please contact our Office of Student Financial Services at 617-373-3190.

Student/Parent Loans
In addition to the federal loans that may be on your Offer of Financial Assistance, there are additional loans that can assist you in financing your Northeastern education. Federal PLUS loans for parents/guardians are available at competitive interest rates; you may borrow up to the cost of your education less any financial aid or loans you are receiving. The MASSPlan, a family loan program, is available to all Northeastern families (regardless of state of residence) once eligibility requirements are met. For information about these and additional borrowing options, please contact our Loan Office at 617-373-3386.

Northeastern's Monthly Payment Plan
If you are interested in using a budget system to pay for part or all of your costs, you may be interested in Northeastern's Monthly Payment Plan. This plan allows you to pay in twelve, eleven, ten, or nine monthly installments, depending on when you enroll in the payment plan. Contact Academic Management Services at 1-800-635-0120 or the Bursar's Office at 617-373-2270 for further information.

Payment Methods and Due Dates

The following are accepted methods of payment.
- Check or Money Order made payable to Northeastern University.
- Mastercard, Visa, American Express, or Discover. Payments may be made by calling our 24-hour automated charge line, 617-373-2319 or, outside the (617) area code, 1-800-937-4067.
- Enrollment in Northeastern's Monthly Payment Plan.

Full payment of tuition, residence hall fees, and other related charges are due prior to the start of each academic quarter. The payment due dates are as follows.

Fall Quarter	
Freshmen	August 1
Upperclass	August 19
Winter Quarter	
Freshmen and Upperclass	November 25
Spring Quarter	
Freshmen and Upperclass	February 26
Summer Quarter	
Freshmen and Upperclass	May 19

Students are responsible for the prompt payment of all bills. If you have not received a bill by the first week of the quarter, please contact the Bursar's Office and a bill will be generated for you.

Any discrepancies on your bill should be brought to the attention of the Bursar's Office in writing within thirty days. If there is a billing problem, pay the undisputed portion of the bill to avoid any additional late fees.

Overloads/Reduced loads. Undergraduate tuition is charged at a flat rate. Full tuition is based on 12 quarter-hours of credit; a reduced load is processed when students go below this number. An overload is charged for amounts exceeding a student's normal program load. This number is not the same every quarter and varies by college/program/year. Students registered full-time may register for an additional one quarter-hour course without an added charge.

Delinquent balances. In cases of student default on tuition payments, the student is liable for the outstanding tuition as well as for all reasonable collection costs and any legal fees incurred by the University during the collection process. Accounts may be subject to monthly interest charges. ***Transcripts and other academic records will not be released until all financial obligations to the University have been met.***

Tuition, Room, Board, and Fees Per Quarter 1998–1999 Academic Year

At Northeastern University, the academic year consists of four quarters. Full-time freshmen spend three quarters in classes and a summer term on co-op or on vacation. Full-time upperclass students participating in the co-op program typically spend two quarters in classes and two quarters on co-op. As a transfer student, the number of quarters you will spend in school depends upon the curriculum of your college. A transfer student may be in school for three quarters and on co-op for one. You are advised to verify your curriculum with your dean's office so that you can plan accordingly.

Freshmen enrolled with partial credit will be charged the upperclass rate the quarter they reach sophomore status.

The total costs for students living in our residence halls and enrolled in the 19-meal plan are as follows:

Tuition and fees per quarter	Freshman	Upperclass
Tuition	$6,000.00	$7,415.00
Student center fee	50.00	50.00
Student activities fee	14.00	14.00
Health service fee	616.00*	616.00*
Room, board, and fees per quarter		
Residence activity fee	$15.00	$15.00
Housing	1,495.00†	1,495.00†
Nineteen-meal plan	1,330.00	1,330.00
Total cost per quarter	9,520.00	10,935.00
Total annual cost	$27,328.00	$21,254.00

Assumption: (Freshmen: three quarters in school; upperclass: two quarters in school)

*Annual Fee: Students may waive health service fee. See University health insurance.

† Rates vary depending on occupancy and assignment. See Room and Board.

The total costs for commuting students are as follows:

Tuition and fees per quarter	Freshman	Upperclass
Tuition	$6,000.00	$7,415.00
Student center fee	50.00	50.00
Student activities fee	14.00	14.00
Health service fee	616.00*	616.00*
Total cost per quarter	6,680.00	8,095.00
Total annual cost	$18,808.00	$15,574.00

Assumption: (Freshmen: three quarters in school; upperclass: two quarters in school)

*Annual Fee: Students may waive health service fee. See University health insurance.

In addition to the expenses itemized above, families should plan on the normal costs of living that students incur for transportation, books, and personal expenses. These vary widely depending upon such things as lifestyle and distance from home, but for the purpose of approximating a student budget, the University estimates these items at $2,550/year for residents and $4,440/year for commuting students.

Tuition rates, room and board charges, and fees are subject to revision by the board of trustees at any time.

The following fees are required of all students.

Application fee. This nonrefundable $40 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of $200, which is applicable towards the first quarter's tuition, is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their letter of acceptance.

Summer orientation fees. Summer orientation registration materials will be mailed to incoming students who have paid their tuition deposit. The summer orientation is a mandatory program for all new and transfer students enrolled in classes for the fall quarter. A nonrefundable fee must accompany the student registration for summer orientation. This fee covers all program materials, meals, and housing. The fee is $150 for new students and $95 for transfers. Session changes once assigned will increase the fee by $10 to cover related administrative costs. Students should contact the Office

of New Student Orientation and Commuter Services if they wish to make payment arrangements for their summer orientation fee. Each parent or family member who will attend the parents/family summer orientation program must also include the nonrefundable fee of $115 with his or her registration.

Student services fee. Students pay a $50 quarterly student center fee to support the Curry Student Center and a $14 quarterly student activities fee to support student clubs.

Husky Card (photo-identification card). This card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs $5.

University health insurance. The University provides hospital insurance for all students who have matriculated, are carrying a course load of nine credits or more, or who are in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Bursar's Office. Deadlines for waiving are applicable. A waiver form must be completed annually at the start of each academic year.

Sports pass fee. This $45 fee ($25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following:

Housing pre-payment. New students seeking on-campus housing must submit a nonrefundable $400 pre-payment along with a completed housing application form to complete the housing application process. The upperclass housing pre-payment is $200 for one quarter or $150 per quarter for two or more quarters.

Residence hall activities fee. All students living in the residence hall system pay a quarterly $15 fee for activities sponsored by the Residence Student Association.

Late fees. All accounts not paid in full by the indicated due dates will be subject to a late fee of $200.

International student fee. A one-time fee of $200 is charged to new undergraduate international students, payable after their acceptance at Northeastern University. The fee supports services available at the International Student Office.

Laboratory fees. Students taking laboratory courses will be charged for laboratory cards. The laboratory card fee will be applied to the tuition bill. Rates for the laboratory cards are as follows:

Arts and Crafts Laboratory	$25	Film Courses Laboratory	$30
Arts Studio Laboratory	$35	Media Studio Laboratory	$35
Biology Laboratory	$50	Medical Laboratory/Science Laboratory	$35
Chemistry Laboratory	$65	Photography Laboratory	$50
Computer Graphics Laboratory	$50	Radiology Laboratory	$25
EMT/Paramedic Laboratory	$25		

Liability insurance. Liability insurance must be carried by students as required by the academic program. This fee of $18 is charged once per year.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen meals per week option ($1,330). Once on campus, freshmen may select either a ten or fifteen meal plan option.

Returning upperclass students must apply for housing each quarter.

Standard Residences (per quarter)

Residence Halls	Single	Double	Triple
Kerr	$1,705	$1,495	
Light	$1,705	$1,495	$1,370
Melvin	$1,705	$1,495	$1,370
Smith	$1,705	$1,495	$1,370
Speare	$1,705	$1,495	
Stetson	$1,705	$1,495	$1,070
White Hall	$1,705	$1,495	$1,370

Suites	Single	Double	Triple
Kennedy Hall	$1,705	$1,495	$1,070
153 Hemenway	$1,705	$1,495	$1,370

Apartments	5 Bed/dbl	6 Bed/dbl	8 Bed/dbl
Loftman Hall	$1,675	$1,635	$1,550

Apartments	Single	Double	Triple	Quad
Burstein Hall		$1,630	$1,380	$1,370
Rubenstein Hall		$1,630	$1,115	$1,370
319 Huntington	$2,090	$1,340	$1,175	$1,095
337 Huntington		$1,340	$1,175	$1,095
St. Stephens St. Apartments		$1,340	$1,175	$1,395
Willis Hall	$2,220	$2,075		$1,780

The rates listed above are for standard room accommodations only. Rates can vary based upon adjusted capacities and room size or occupancy.

Freshman residence termination fee. Students who sign the license agreement are required to live on campus for the terms of the agreement. Students who fail to honor their agreement will be subject to a termination fee of 50 percent of subsequent quarters room charge.

Other residence rate adjustments. Students who terminate their license agreements before the third quarter, either voluntarily or involuntarily, will be assessed charges as outlined in the Residence Hall and Dining License Agreement.

Residence rate adjustments may be made provided specific conditions are met and a housing withdrawal form has been filed with Residence Life Office. Details regarding these conditions may be found in the Residence Hall and Dining License Agreement.

Freshmen and transfer students should refer to the Residence Hall and Dining License Agreement for specific rate adjustment information.

The standard adjustment rates for upperclass and upperclass graduate students are:

During the first week	75 percent credit
During the second week	50 percent credit
During the third week	25 percent credit
After the third week	no credit

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter	
19	$1,330	
15	$1,205	
10	$1,085	
5	$ 535	upperclass only

Husky account. Students may deposit funds into a dining plan, which allows them to "drawdown" from the account to purchase food or other items available at specific locations throughout the campus. Contact the Husky Card office at 617-373-8322 for additional information.

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievement. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office and also appears in the registrar's course listings.

There are two other types of honors courses. *Honors within a standard course* are activity courses that allow students to substitute special work for some of the standard assignments within the course. *Honors outside a standard course* are adjunct courses that carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Activity and adjunct courses only appear on the listing in the honors program office. Because they do not carry separate numbers, activity and adjunct courses do not appear as honors-level in the registrar's course listings. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurricular cultural and recreational activities. Students may choose special honors housing in 115–119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

For academic credentials to be considered for the following scholarships, a completed admissions application should be submitted no later than January 1 preceding fall enrollment.

Merit Scholarships

Ambassador Award. The University offers five half-tuition scholarships for exceptional academic achievement to non-U.S. citizens for the freshman year (September through June). The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are not renewable.

Boston Youth Leadership Award. *Award:* $6,500 grant for campus room and board. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.0. *Eligibility:* Applicants for fall freshman admission to Northeastern University who have demonstrated outstanding community leadership and service and who will graduate in the top quarter of their class at a Boston public, private, or parochial school. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Carl S. Ell Scholarship. *Award:* Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.25. *Eligibility:* Applicants for fall freshman admission to Northeastern University who will graduate from high school in the top 5 percent of their graduating class with a combined math and verbal score of 1250 or higher on the Scholastic Assessment Test (SAT). Awardees must reside on campus, maintain enrollment in the Honors Program, and follow procedures to receive state and/or federal education grants to which they may be entitled.

Northeastern University Merit Scholarship. *Award:* Full tuition scholarship plus $2,000 for campus room and board. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.25. *Eligibility:* Awards guaranteed to National Merit Scholarship program finalists and semi-finalists who reside in the six New England states, graduate in the top 15 percent of their high school class, and complete the financial aid and admission application process by stated deadlines. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Ralph J. Bunche Scholarship. *Award:* Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are African American and who will graduate from high school in the

top 10 percent of their graduating class with a combined math and verbal score of 1150 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Reggie Lewis Memorial Scholarship. *Award:* Full tuition scholarship plus $2,000 campus room and board grant. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are members of a federally designated ethnic minority group and will graduate from high school in the top 20 percent of their graduating class with a combined math and verbal score of 1150 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Compensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, College Writing 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000	Mathematical Preliminaries 1
ENG 1110	College Writing 1†
or	
ENG 1013	Basic Writing

Winter*

MTH 1010	Mathematical Preliminaries 2
ENG 1111	College Writing 2

Please note that successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for:

MTH 1101, MTH 1106, MTH 1107, and MTH 1108	Nonbusiness mathematics sequence; and
MTH 1113 and MTH 1114	Business mathematics sequence

A passing letter grade in College Writing 1 is a prerequisite for:

ENG 1111	College Writing 2

*The same sequence is offered winter/spring for students who enter in January.
†Students whose work in this course is unacceptable for success in ENG 1111, College Writing 2, will receive a grade of U and must repeat ENG 1110.

Schedule for Continuation of Compensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no designates non-acceptance, and an n/a, not applicable.

	College Writing 1 Basic Writing (ENG 1110/1013)	**Basic Writing College Writing 2** (ENG 1110/1111)	**Mathematical Preliminaries 1*** (MTH 1000)	**Mathematical Preliminaries 2*** (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science[1]	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes[2]	yes[2]
Engineering[1]	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes[3]	yes	no	no

[1]This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.
[2]Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.
[3]This college will accept ENG 1110 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Training Program

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-373-2372.

Army

Richard D. Bourgault, Lt. Col., U.S. Army, MBA, *Professor and Chair, Department of Military Science*

Assistant Professors
Paul J. Cancelliere, Maj., BA
Sterling D. Macleod, Maj., BA
Mark C. Boussy, Capt., BS

Instructor
Bobby R. Captain, SFC, AA

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middler, junior, and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent) or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a $150-per-month stipend while in school. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for $16,000 per year scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. Scholarship students also receive allowances for textbooks and a $150-per-month stipend while in school.

Transfer students, whether or not previously enrolled in ROTC, are welcome to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

Air Force

Valerie A. Johnston, *Capt., U.S. Air Force, Assistant Professor*
Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1501, or call 617-353-4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur an eight-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character, and successfully complete a six-week field training encampment during the summer before the start of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to college freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships. The scholarships include full or partial tuition, a $150 per month stipend, and a book allowance.

Navy Nursing Program

Michael L. McHugh, Capt., U.S. Navy, MS, *Professor and Chair, Department of Naval Science, Boston University*

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Nursing students wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a $150 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a $150 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years; college-program students serve for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each major description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

College of Arts and Sciences, Dean's Office		100 Meserve
Academic Program Offices	African-American Studies	132 Nightingale
	American Sign Language–English Interpreting	405 Meserve
	Anthropology	501 Holmes
	Art and Architecture	239 Ryder
	Behavioral Neuroscience	125 Nightingale
	Biochemistry	414 Mugar
	Biology	414 Mugar
	Chemistry	102 Hurtig
	Communication Studies	101 Lake
	Economics	301 Lake
	Education	54 Lake
	English	406 Holmes
	Geology/Environmental Geology	14 Holmes
	History	249 Meserve
	Human Services	33 Lake
	International Affairs	303 Meserve
	Journalism	102 Lake
	Linguistics	563 Holmes
	Mathematics	567 Lake
	Modern Languages	400 Meserve
	Music	351 Ryder
	Philosophy and Religion	371 Holmes
	Physics/Applied Physics	111 Dana
	Political Science	303 Meserve
	Psychology	125 Nightingale
	Sociology	500 Holmes
	Theatre	337 Ryder
Bouvé College of Pharmacy and Health Sciences		134 Mugar
College of Business Administration		250 Dodge
College of Computer Science		161 Cullinane
College of Criminal Justice		400 Churchill
College of Engineering		220 Snell
School of Engineering Technology		120 Snell
College of Nursing		102 Robinson
School of General Studies		249 Ryder

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Office of the Registrar, 120 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university or University College may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617-373-2512.

Writing for the Professions	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop specified for major	ENG 1340
Writing for the Health Professions	ENG 1380
Advanced Writing	ENG 1352
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Pharmacy and Health Sciences (PAH)	ENG 1350 or ENG 1340
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125 or ENG 1340
School of Engineering Technology (ENG'G)	ENG 1340
College of Nursing	ENG 1380

Diversity Requirement

In 1995 the Student Government Association proposed to the Faculty Senate that a diversity requirement become part of the curriculum for every student at the University, and the Faculty Senate adopted this proposal. Northeastern University requires all students to complete before graduation three or more credits or to participate in a program (including but not limited to overseas co-op, study abroad, and involvement in student activities and diversity training) deemed as satisfying the diversity requirement. Each college has developed its own program to satisfy this requirement. Please consult your college for the details of its program.

The Academic Common Experience

In June 1995, Northeastern University adopted the Academic Common Experience (ACE), a new model for all undergraduate programs. In ACE, the faculty identified a set of shared general education goals for all students in all majors. The implementation of this model calls for the integration of general education, study in the major, and cooperative education throughout each student's curriculum. The ACE shared goals are:

Skills: Effective thinking, effective communication, information literacy, and interpersonal skills.
Contexts: The natural world, and the social/cultural world.
Perspectives: The historical, the ethical, the aesthetic, and the personal.
Connections: Across disciplines, between the theoretical and the applied, between the academy and the world of work, and between college study and lifelong learning.

This model of general education is predicated on the beliefs that:

- the skills and perspectives of general education are integrally connected to mastery of a discipline;
- curricular planning and teaching must focus on student learning;
- learning occurs best when knowledge or skills acquired are reinforced in and applied to new circumstances; and
- valid learning happens outside as well as inside the classroom.

Course content and course assignments throughout the program of study should reflect these shared goals. As students progress through their individual academic and cooperative education programs, there is progressive and cumulative learning that reinforces and broadens understanding and appreciation of these goals both personally and professionally.

Undergraduate Degrees

College of Arts and Sciences

Bachelor of Arts

Bachelor of Science

Majors
Concentrations
Minors

African-American Studies
Cultural Studies
Historical Studies
Social/Behavioral Studies
African-American Studies

American Sign Language–English Interpreting[1]

Anthropology
Anthropology

Applied Physics[1]

Art
Architecture
Graphic Design
Art

Behavioral Neuroscience
Neuroscience

Biochemistry[1]

Biology
Marine Biology

Biomedical Physics

Chemistry
Chemistry

Communication Studies
Speech and Rhetoric
Organizational Communication
Radio and Television
Communication Studies

Economics
Economics

Education (Programs)
Early Childhood Education
Elementary Education
Secondary Education

English
Creative Writing
Literature

Environmental Geology
Environmental Geology

Environmental Studies

Geology
Geology

History
History

Human Services
Human Services

Independent Studies

International Affairs
International Affairs

Journalism
Advertising
Newspaper/Print
Public Relations
Radio/Television News

Linguistics
Linguistics

Mathematics
Mathematics

Modern Languages
French
German
Italian
Russian
Spanish
French
German
Italian
Russian
Spanish

Music
Music Industry[1]
Music Literature[2]
Music Literature and Performance[2]
Music
Music Industry

Philosophy
Philosophy
Religious Studies

Physics
Physics

Political Science
Law and Legal Issues
Public Administration
Political Science

Psychology
Psychology

Sociology
Sociology

Theatre
Theatre Generalist
Production
Performance
Theatre

Integrated Dual Majors Program

Multimedia Studies
Animation
Graphic Design
Photography
Music and Technology

Interdisciplinary Minors
Asian Studies
Cinema Studies
International Affairs
Jewish Studies
Latino, Latin American, and Caribbean Studies
Linguistics
Marine Studies
Media Studies
Technical Communication
Urban Studies
Women's Studies

[1] Bachelor of Science only
[2] Bachelor of Arts only

Bouvé College of Pharmacy and Health Sciences

Associate in Science

Bachelor of Science

Doctor of Pharmacy (6-year program)

Majors
Concentrations
Minors

Athletic Training

Cardiopulmonary Sciences
Cardiovascular Technology
Exercise Physiology
Respiratory Therapy

Cardiovascular Health and Exercise

Medical Laboratory Science
Medical Laboratory Science

Rehabilitative Science

Additional Degrees

Associate in Science in Dental Hygiene

Bachelor of Science in Dental Hygiene

Bachelor of Science in Pharmacy

Bachelor of Science in Physical Therapy

Bachelor of Science in Speech-Language Pathology and Audiology

Bachelor of Science in Toxicology

College of Business Administration

Bachelor of Science in International Business

Bachelor of Science in Business Administration

Concentrations

Accounting

Entrepreneurship and New Venture Management

Finance and Insurance

Human Resources Management

International Business Administration

Logistics and Transportation

Management

Management Information Systems

Marketing

Minor

Business Administration

College of Computer Science

Bachelor of Science

Bachelor of Arts

College of Criminal Justice

Bachelor of Science

Concentrations

- Criminology and Corrections
- Legal Studies
- Policing and Security

College of Engineering

Bachelor of Science

Bachelor of Science in Chemical Engineering

Bachelor of Science in Civil Engineering

Bachelor of Science in Electrical Engineering

Concentrations

- Electrical Engineering
- Computer Engineering
- Power Systems

Additional Degrees

Bachelor of Science in Industrial Engineering

Bachelor of Science in Mechanical Engineering

Bachelor of Science/Master of Science in Electrical Engineering

Bachelor of Science/Master of Science in Industrial Engineering

Bachelor of Science/Master of Science in Mechanical Engineering

College of Nursing

Bachelor of Science in Nursing

School of Engineering Technology

Bachelor of Science in Engineering Technology

Majors

Aerospace Maintenance Engineering Technology

Computer Technology

Electrical Engineering Technology

Mechanical Engineering Technology

Minors

Computer Technology

Electrical Engineering Technology

Mechanical Engineering Technology

College of Arts and Sciences

TBA, *Dean*
Timothy Donovan, PhD, *Associate Dean, External Affairs*
Kay D. Onan, PhD, *Associate Dean, Faculty Affairs, and Director of the Graduate School*
Malcolm D. Hill, PhD, *Associate Dean, Undergraduate Affairs*
Joyce Interrante, MA, *Coordinator, Academic Student Services*
Mary Mello, MA, *Director, Academic Student Services*
Gail F. Leclerc, MEd, *Academic Adviser*
Beth Rascoe, MA, *Assistant Coordinator, International Study Programs*
Todd Rich, MS, *Coordinator, International Study Programs*
Gail Stubbs, MEd, *Associate Director, Academic Student Services*
Jan Swindlehurst, MFA, *Coordinator, Undergraduate Academic Services*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices. The college also emphasizes experiential education through cooperative education, service-learning, and other kinds of internships, student-faculty research collaborations, and study abroad.

In most programs, students may choose a three-year intensive, or a four- or five-year experiential education plan. The five-year plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language or American Sign Language. The Bachelor of Science degree requires fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major, and the college offers a number of specific integrated dual major programs. Students who pursue either a double major or an integrated dual major are allowed unlimited double counting between their major and core curriculum courses. Students whose double major involves a BA and BS degree or two BA degrees may do the BS version of the core curriculum but must still complete the foreign language requirement.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. Some majors have additional requirements in order to progress from year to year. For further details, refer to the *College of Arts and Sciences Guidebook* available in the Center for Experiential Education and Academic Advising in One Meserve Hall.

Transferring to Arts and Sciences Majors

The criteria and process for transferring into each Arts and Sciences major may be found in the *College of Arts and Sciences Guidebook.* Although students may meet the criteria, however, acceptance into certain majors is also based on space availability.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts (BA) or Bachelor of Science (BS) degree must successfully complete a minimum of 176 quarter hours. In addition, a combination of no more than 4 quarter hours of (1 or 2 credit) physical education activity courses or ROTC credits may be used to meet this requirement.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in progress at the time of application, the student must submit an updated official transcript for review once grades for the courses have been posted. Students should contact a major or dean's office adviser prior to enrollment or during their first quarter to have transfer credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the College of Arts and Sciences dean's office, 400 Meserve Hall.

Core curriculum. All students in the College of Arts and Sciences must complete the college's core curriculum in order to graduate. The college believes that there are important areas of inquiry with which all students should have experience. The core curriculum is a set of course requirements intended to provide the breadth of experience essential to a well-rounded individual and the broad base of knowledge traditionally associated with a liberal arts education.

All students receive instruction in fundamental English and mathematics. In addition, students pursuing the Bachelor of Arts degree study a foreign language. The core curriculum is meant to complement students' major programs by providing opportunities to explore a range of disciplines in the arts and humanities, social sciences, and mathematics and sciences, as well as to learn the issues, perspectives, and analytical tools used in these domains. The core also familiarizes students with areas and approaches to learning not available strictly through their own major.

Students explore Western cultural history as it has shaped our society and the traditions of non-Western cultures that are becoming increasingly important in an interconnected world. The core curriculum introduces historically important work views, theories, and changes in intellectual history, as well as current issues and problems facing contemporary society.

The core curriculum has the additional function of providing students with crucial skills useful in all areas of study and in future life endeavors. Every course within the core emphasizes writing proficiency, analytical thought, and methods of inquiry. Writing is the key to communication and is necessary for clear thinking and the expression of one's ideas; methods of inquiry comprise ways of learning; and analytical thought comprises logical thinking, which is the construction of valid arguments. Instruction in core courses strives to emphasize all these skills, which form the basis of a well-educated and intellectually skilled student who can apply his or her talents in whatever field of endeavor s/he chooses to undertake.

The core curriculum consists of six categories:

Category I Basic Skills
- Freshman English (two or three courses depending on placement level upon entry to the University)
- College mathematics (one to three courses depending on placement level upon entry to the University)
- Modern language or American Sign Language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry
Category III The Western Cultural Heritage
Category IV Alternative Cultures and Societies
Category V Theoretical Perspectives and Changes
Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the appropriate department or the Office of the Dean, 400 Meserve Hall.

Descriptions for all College of Arts and Sciences courses begin on page 132. Courses approved for the college's core curriculum are noted in parentheses at the end of the appropriate course descriptions. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Center for Experiential Education and Academic Advising in One Meserve Hall, provides a list of courses that may be used to fulfill each category requirement and more specific details on the core curriculum.

Experiential Education Requirement. All Arts and Sciences students who will graduate in or beyond the year 2000 are required to fulfill a college experiential education requirement. This requirement is made up of two components: 1) an approved learn-by-doing experience (e.g., co-op, internships, fieldwork or practica, study-abroad programs, service-learning projects, and others) and 2) an academic course that is designed to allow the student to reflect upon the experiential component. Students are considered to have fulfilled the college's experiential education requirement only when both components have been satisfactorily completed. Although the experiential requirement does not

necessarily have to be fulfilled in the student's major, each department does have specific ways for its students to fulfill the requirement.

The experiential education requirement should generally be completed during the middler, junior, or senior year. Academic courses that fulfill the course component of the experiential education requirement are listed and described in the *Guide to the College of Arts and Sciences Experiential Education Requirement* booklet, which is available in the Center for Experiential Education and Academic Advising in One Meserve Hall. This guide gives more specific information about the requirement and informs students about how to plan for it. Academic departments and program offices also have information specific to the requirement for the majors that they offer, and every major has an experiential education adviser available to students who have questions about the requirement or who need advice on how to fulfill it. These advisers are also listed in the guide.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language or American Sign Language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be fulfilled in the full-time day programs at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program should complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332, Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a video production requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

Required courses. INT 1320, Exploring the Humanities through Film, or LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1180, Video Basics; or CMN 1450, Television Studio Production. ***Choose five electives:*** AFR 1133, History of Blacks in the Media and the Press; ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; CMN 1451, Foundations of Broadcast Technology; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); CMN 1620, Television Criticism; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNC 1553, Chinese Film: Gender, Ethnicity, and Urbanity; LNF 1521, French Film and Culture; LNF 1560, Film and Psychoanalysis; LNG 1554, Modern German Film and Literature; LNR 1550, History of Soviet Cinema; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (21 Dockser), at 617-373-5163.

Minor in International Affairs

The minor in International Affairs provides students with the opportunity to develop a greater awareness and understanding of both regional and global issues. It seeks to better prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

Students must have a minimum grade point average of at least 2.75 to declare an International Affairs minor and must maintain a minimum 2.75 grade point average until the completion of their International Experience.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study-abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international co-op, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

Elective categories. A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category. All electives must be taken from outside the student's major.

Regional Analysis. Students must select two or three courses from this category, and these courses must be chosen from at least two different regional subcategories.

Africa: AFR 1197, Modern African Civilization; AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization; AFR 1342/POL 1342, Crisis and Conflict in Black Africa; AFR 1403/HST 1623, History of West Africa; and AFR 1405/ HST 1625, South African History.

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History; HST 1633, Modern China; HST 1634, Contemporary China; HST 1637, Modern Japan; MUS 1183, Music of East Asia; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions; PHL 1293, Eastern and Nontraditional Philosophy; POL 1332, Government and Politics of Japan; POL 1371, Government and Politics of China; SOC 1104, Sociology of Japan.

Europe: ART 1204, Renaissance Architecture; ART 1205, Renaissance Art; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society; LNG 1554, Modern German Film and Literature; LNS 1550, Spanish Civil War in Spanish Film; POL 1306, Politics in Western Europe; POL 1340, Crisis and Change in Central/Eastern Europe; POL 1343,

Politics and Violence in Northern Ireland; POL 1347, Russian Politics After Communism; SOC 1105, Society and Culture in Russia and the Former Soviet Union.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of South America, Latin America, and the Caribbean; POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East; POL 1346, Gender in the Middle East.

Global Dynamics and Development. Students must choose at least two courses from this category:

AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1190/IAF 1190, The Global Economy; ECN 1330, Development Economics; ECN 1335, International Economics: Finance; ECN 1336, International Economics: Trade; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business; INB 1731, Cultural Aspects of International Business; INB 1735, Import and Export Management; PHL 1130, Ethics East and West; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1309, International Political Economy; POL 1313, International Organization; POL 1337, U.S. Foreign Policy; POL 1338, Religion and Politics; POL 1355, Ethnic Conflict; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1104, Cultures of the World; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOA 1430, Latin American Society and Development; SOC 1171, Race and Ethnic Relations: A World Perspective.

Minor in Jewish Studies

The minor in Jewish studies provides students the opportunity to undertake the study of Jewish religion, culture, and history at Northeastern or in combination with courses at Hebrew College in Brookline, Massachusetts, and courses under the study-abroad program. Students take seven courses. A minimum of four courses must be taken at Northeastern.

All students must take PHL 1285, Introduction to Jewish Religion and Culture, and a senior-level directed study or seminar that involves a major research project.

Additional courses at Northeastern. HST 1539, American Jewish History; POL 1384, The Arab-Israeli Conflict; PHL 1315, Understanding the Bible; ENG 1558, Jewish Themes in Literature (Literature in Context); MUS 1185, Music of the Jewish People; SOC 1350, Jewish Women in U.S. Culture; PHL 1325, Responses to the Holocaust; and up to two of the following courses: ED 1423, Ethnic and Multicultural Education; PHL 1110, Introduction to Religion; POL 1338, Religion and Politics; POL 1345, Government and Politics in the Middle East; SOC 1470, Sociology of Religion; SOC 1140, The Sociology of Prejudice.

Students may petition the Jewish studies coordinator to gain Jewish studies credit for any courses not on this list for which they do substantial work in Jewish studies.

Courses at Hebrew College. Students take courses approved by the coordinator of Jewish studies at Northeastern. Students should contact the University registrar, Dean Edmund Mullen, for more information about enrolling at Hebrew College.

Study abroad. Students take courses at Hebrew University, Tel Aviv University, or Ben Gurion University of the Negev under the study-abroad program. Courses must be approved by the coordinator of Jewish studies at Northeastern.

For more information contact the Jewish studies coordinator, Professor James Ross, at 617-373-4050.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary program drawn from six academic departments (African-American Studies, History, Music, Political Science, Modern Languages, and Sociology/Anthropology). Latin American Studies combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Latin American society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study-abroad programs. It is strongly recommended that students pursuing the minor achieve profi-

ciency in Spanish. Students take six required courses and either complete an internship or co-op experience in a community-based agency or participate in a study-abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

History: AFR 1196, The Black Experience in the Caribbean; HST 1537, Latin America and the Caribbean in Boston; HST 1538, History of Latinos(-as) in the U.S.; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean History.

Language, literature, music, and religion: ENG 1600, Topics in Literatures; LNS 1250, History of the Spanish Language; LNS 1315, Latin American Literature 1; LNS 1316, Latin American Literature 2; LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and PHL 1265, Latin American Religions.

Social science: POL 1368, Government and Politics of Latin America; POL 1396, Latino Politics in the U.S.; SOA 1133, The Americas from an Indigenous Perspective; and SOA 1430, Latin American Society and Development.

Comparative Studies (courses that include Latin America, the Caribbean, or Latino Society in a comparative context): AFR 1155, Foundations of Black Culture; AFR 1248, Race Relations in America; AFR 1294, Third World Political Relations; ECN 1170, Economic Issues in Minority Communities; ECN 1191/ IAF 1330, Development Economics; ECN 1315, Income Inequalities and Discrimination; HST 1121, World Civilization to 1648; HST 1122/IAF 1122, World Civilization Since 1648; HST 1644, Third World Women; LNS 1500, The Backgrounds of Spanish Culture; LNS 1550, Spanish Civil War in Spanish Film; MUS 1180, Introduction to World Music; POL 1316, Contemporary Revolutionary Politics; POL 1338, Religion and Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture.

For more information, please contact the program coordinator at 617.373.3956.

Minor in Linguistics
Curriculum

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, Sociology/Anthropology) collaborate to offer the Minor in Linguistics. Students in many majors find linguistics a compatible major. Courses are cross-listed under LIN and the other departmental prefix and can be used interchangeably in the two areas.

LIN 1118, Introduction to Language and Linguistics 1; LIN 1218, Introduction to Language and Linguistics 2; one of the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1402, Grammars of English; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499/PSY 1499, Psychology of Reading; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

For more information, contact Professor Janet Randall, 617-373-3678, or the Linguistics Program Office in 563 Holmes Hall, 617-373-4553.

Minor in Marine Studies
Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617-373-3176.

Minor in Media Studies Curriculum

The media studies minor is intended for students who seek an intense education in the field of mass communication through an exposure to coursework in a number of academic disciplines. Coursework includes theory, criticism, and production. The minor may be taken as a complement to a major in any department or college at the University. Individual programs may be developed with the approval of the chair of the Department of Communication Studies or the director of the School of Journalism. Consult your adviser to determine the course of study most appropriate for your educational goals. Students must complete four courses from the following list to fulfill the minor: CMN 1250, Introduction to Mass Communication; CMN 1450, Television Production*; CMN 1451, Foundations of Broadcast Technology*; HST 1575, History of Media in America; JRN 1512, Journalism Ethics and Issues. In addition, students must complete four other courses, including one course from each area of the following: ***technical/production:*** ART 1281, Video Basics; CMN 1452, Radio Production*; CMN 1455, Television Field Production; JRN 1421, Television Newswriting; JRN 1422, Television News Production; ***management:*** CMN 1453, Broadcast Management*; CMN 1454, Programming for Radio and Television*; JRN 1508, Law of the Press; ***criticism:*** CMN 1317, The Audience in Mass Communication*; CMN 1620, Television Criticism*; HST 1494, History and Film; INT 1320, Exploring the Humanities through Film. Special Topics courses may apply to the minor when the topics are focused on media. They may be used to fulfill any of the above elective areas.

For further information about the program, contact Professor Nicholas Daniloff, 102 Lake Hall, or Dr. Richard Katula, 145 Meserve Hall.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 *or* ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing *or* ENG 1380, Writing for the Professions: Health Services or ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking *or* CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101 Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1226, Modern Architecture: The Twentieth Century; ART 1150, Architectural Design 1.

African-American studies: AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor John Portz, political science, 303 Meserve Hall, 617-373-2796; Professor George Thrush, art and architecture, 309 Ryder Hall, 617-373-2083; Professor Gregory Wassall, economics, 317 Lake Hall, 617-373-2196.

Minor in Women's Studies Curriculum

The Women's Studies program offers students an opportunity to work with respected scholars in a variety of disciplines to examine the human experience through the perspectives of women. This interdisciplinary program examines the importance of gender in societies around the world, past and present. The curriculum encourages students to learn and think about how changing beliefs about women and men have affected research and scholarship in the arts, humanities, and social and natural sciences. Students learn about gender stereotypes, the various ways ideas about gender and sexuality have developed, and the changing situation for women and men today. Key questions are posed that change how people see the world: How does gender influence the kinds of questions we can ask of the world around us? What information can become data when you use gender as a central part of examining a problem? The Women's Studies program coordinates the Boston Area Colloquium on

*Some courses require prerequisite courses or permission of instructor.

Feminist Theory lecture series, sponsors talks by scholars on campus, produces the Working Papers in Gender Studies Series, and sponsors the Visiting Research Scholars in Women's Studies series. Women's Studies also works closely with the independent, student-run Women's Center to sponsor programs for Women's History Month and other events of special concern to women students.

To minor in Women's Studies, students take a total of seven courses: SOC 1150 *or* INT 1150, Introduction to Women's Studies; SOC 1302 *or* INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; AFR 1121, African American Literature 1; AFR 1133, History of Blacks in the Media and the Press; AFR 1251, Survey of Black Drama; AFR 1442, African American Women; CJ 1616, Women and the Criminal Justice System; CMN 1232, Gender and Communication; CRS 1503, Human Sexuality and Family Dynamics; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature (when gender related); ENG 1602, Major Figure (when gender related); ENG 1678, Early African American Literature; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1306, Spanish Golden Age Theatre; LNS 1500, Backgrounds of Spanish Culture; LNS 1510, Saints and Sinners; MUS 1106, Women, Gender, and Music; MUS 1800, Directed Study (when gender related); NUR 1303, Life Crisis: Analysis and Response; NUR 1606, Women's Health Choices; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1327, Gender Politics; POL 1328, Women in Public Management; POL 1346, Gender and Politics in the Middle East; PSY 1218, Psychology of Women; PSY 1251, Food, Behavior, and Eating Disorders; SOA 1100, Peoples and Cultures; SOA 1146, Rural Workers in the Third World; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOA 1430, Latin American Society and Development; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; SOC 1217, Women, Health, and Social Change; and SOC 1350, Jewish Women in U.S. Culture. New courses are being developed.

Undergraduate students who want to integrate their interest in women's studies with a major discipline can consult with the Women's Studies coordinator to develop an interdisciplinary major. Plans are under way for a dual major.

Graduate students interested in women's studies should note that, pending approval, a non-degree Graduate Certificate in Women's Studies may be available soon. Currently, graduate students in the sociology and anthropology department can develop a specialization in gender. A range of departments and colleges offer graduate courses in gender.

Graduate elective courses. CJ 3515, Gender and Justice: Women, Crime, and the Law; CRS 3356, Seminar in Feminist Theory; CRS 3384, Human Sexuality; ENG 3315, Contemporary Critical Theory; ENG 3317, Topics in Criticism: Feminist Literary Theory; ENG 3333, Major Figures in African American Literature; Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3361, European Women's History; HST 3370, Seminar in History of the Family; HST 3398, Seminar in Feminist Theory and Historical Inquiry; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; SOA 3102, Class and State Formation; SOA 3103, Gender, Sexuality, and Culture; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3302, Feminist Methodologies; SOC 3304, Feminist Theory; SOC 3319, Contemporary Religious Identity: A Feminist Focus; SOC 3365, Social Movements; SOC 3412, Contemporary Issues in Sociology when gender oriented; and NUR 1606, Women's Health: Choices and Decision. New courses are being developed and added.

Matriculated graduate students can also take courses through Northeastern's affiliated Graduate Consortium in Women's Studies at Radcliffe College. Team-taught courses offered regularly include Feminist Perspectives in Research; Gender, Sexuality, and Culture in Latin American and U.S. Latino/a Society; Telling Lives; Genre and Gender in Women's Life Narratives; and Narratives of Gender and Kinship in Industrializing Societies. Students should apply through the Consortium and can pick up application forms at the Women's Studies Office, 524 Holmes Hall. Consortium courses involve no additional tuition.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Ms. Audrey Aduama at 617-373-4984.

Special Programs

Additional information is available from involved departments and the Center for Experiential Education and Academic Advising, One Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Dual Majors

Students with interests in two separate fields have traditionally pursued both by enrolling in a double major (completing all course requirements in both majors), a major and a minor (7–9 courses), or an interdisciplinary major (e.g., Behavioral Neuroscience, Biochemistry, International Affairs). Dual majors are an option for students interested in linking concepts across disciplinary boundaries. In a dual major, faculty in two majors have identified thirteen courses from each major, plus an additional two to four courses that specifically help students link the concepts learned in one major with those in the other. Fulfilling the college's Experiential Education requirement provides an additional opportunity for supervised work linking the two areas. At the present time, eleven dual majors have been approved (Multimedia Studies and Art; Multimedia Studies and Music; Journalism and Modern Languages; Philosophy and Economics; Philosophy and Political Science; Political Science and Economics; Political Science and Sociology; Psychology and African-American Studies; Sociology and Journalism; History and Art; Economics and Sociology) and others, including four cross-college dual majors, are currently in the University's review process.

Independent Major

An eligible student may propose an independent major to the College Curriculum Committee. Information concerning eligibility, procedures, and requirements for independent majors is available in the Center for Experiential Education and Academic Advising, One Meserve Hall. Students interested in proposing an independent major should meet with a Dean's Office adviser in the Center before beginning this process. The adviser will help the student locate faculty who may be interested in helping the student with the proposal, as well as a faculty member who may be interested in serving as one of the student's faculty advisers. No student may be considered for an independent major until an independent major proposal has been approved by the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

Bachelor of Arts or Bachelor of Science/ Juris Doctor Degree Program

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

Bachelor of Arts or Bachelor of Science/ Master of Business Administration Program

A limited number of students may combine an initial period of undergraduate study in the College of Arts and Sciences with graduate study in the College of Business Administration, enabling students to earn both the Bachelor of Arts or Bachelor of Science and the Master of Business Administration degrees including one year of co-op work experience (six months undergraduate and six months graduate) in a five- or six-year period.

In the first three years, students complete nine academic quarters of arts and sciences courses with two quarters of cooperative education. After taking the GMAT and being accepted into the College of Business Administration in the third year, students spend their fourth year completing requirements in their undergraduate major and beginning graduate coursework in the Cooperative Education MBA Program. Depending on the undergraduate major, twelve credits of undergraduate study may be applied toward the MBA or twelve credits of MBA study may be applied toward the bachelor's degree. Students may begin the Cooperative education MBA portion of study in January or June.

Interested students should contact the College of Business Administration's graduate school in 350 Dodge Hall.

Northeastern University–Hebrew College Exchange

This program offers students the opportunity to register for courses in specialized areas of Jewish studies and Jewish education. See page 36, Minor in Jewish Studies, or contact the University registrar, Dean Edmund Mullen, 120 Hayden Hall, 617-373-2183, for more information on the registration process for this exchange program.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-373-2234.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to

particular needs and interests of the students. Students use role-playing extensively and practice "intake" interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student seeking co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-373-3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall at the University of Washington's Friday Harbor Laboratories, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The final phase of the program is conducted at Northeastern's Marine Science Center in Nahant, Massachusetts. For more information, contact Sal Genovese at 617-595-5597.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617-373-4380.

Sea Education Association. The Sea Semester offers a combination land-sea program in marine science, maritime navigation and history, and practical seamanship with deep-water oceanographic research. A six-week sea voyage, often to the Caribbean or the Canadian Maritimes, provides hands-on experience.

The Center for the Arts

The primary mission of the Center for the Arts is to support and develop the arts as a vital and integral component of the Northeastern community. Through a variety of mainstage and artist-in-residency programs, featuring performing and visual artists acclaimed for their excellence, the center complements the academic arts departments in their effort to educate Northeastern students in becoming knowledgeable, discriminating, and active participants in the arts. In addition, the center supports curriculum-oriented arts projects and events, encourages interdepartmental collaborations, develops exhibitions and presentations that serve the on-campus community as well as the general public, provides multicultural arts programs, and acts as a primary facilitator for research in the arts.

The center also manages the Blackman Auditorium Theatre Complex and operates the Northeastern University Ticket Center. Tickets to and information about performing and visual arts events and other campus events are available in the ticket center as are tickets and passes to Boston area dance, music, theatre, film, and visual arts events. The ticket center also provides free passes and maintains a University membership to the Museum of Fine Arts that entitles all undergraduate students in the full-time day programs to free membership privileges.

For information on arts activities, please call the Center for the Arts office at 617-373-2249. For ticket information, call the ticket center at 617-373-2247.

Study Abroad

The College of Arts and Sciences strongly endorses the importance of an international experience as a dimension of learning. To foster this, it maintains an Office of International Study Programs that has developed a series of programs tailored to the interests and needs of Northeastern University students. Students who successfully complete a college study-abroad program are considered to have fulfilled the college's experiential education requirement.

Students who wish to pursue a particular program sponsored by Northeastern University or another institution should arrange to discuss the program in which they are interested with the Coordinator of International Study Programs, One Meserve Hall, (617) 373-5162, and with one of the Dean's Office academic advisers in the Center for Experiential Education and Academic Advising, One Meserve Hall, to ensure that credits granted through study abroad will be applicable to their program in the college. Students who participate in Northeastern-sponsored study-abroad programs maintain their full-time Northeastern status, and their grades will be calculated into their QPA.

The general requirements for participation in all Northeastern University study-abroad programs are: middler-year standing or above, and QPA of 3.0 or higher. The Office of International Study Programs maintains a rolling admission policy for most programs; early application is advised.

Africa/Middle East

Ghana, Accra: University of Ghana. Offers students an opportunity to study West African history, politics, music, literature and culture and to learn how to speak Twi. All courses are taught in English.

South Africa, Cape Town: University of Cape Town. Allows students to pursue their studies while providing first-hand knowledge of contemporary South African life and society in one of the world's most beautiful cities.

Egypt, Cairo: American University of Cairo. Offers students an opportunity to study Egyptian and Arabic history, culture, and contemporary issues. Courses are taught in English and are available in most arts and sciences majors.

Israel, Tel Aviv: Tel Aviv University. Live and study in the cultural and commercial center of modern Israeli life. Taught in English, courses are available in most arts and sciences disciplines, with an emphasis on Middle Eastern and Jewish studies.

Americas

Argentina, Buenos Aires: Universidad del Salvador. Allows students fluent in Spanish to live and study in the heart of one of South America's most successful new democracies. Courses are taught exclusively in Spanish.

Canada, Vancouver: Simon Fraser University. Provides students with the opportunity to learn about the politics, geography, economies, and cultures of Canada and the Pacific Rim countries. Courses are available in all arts and sciences disciplines.

Chile, Santiago: Pontificia Universidad Catolica de Chile (PUC). Offers students with an advanced knowledge of Spanish the opportunity to study in this beautiful and dynamic country, living with a host family. Students may choose from the full course catalog.

Mexico, Puebla: Universidad de las Americas-Puebla (UDLA). Allows students to learn about North American political and social issues from a Mexican perspective. Each semester some social science courses are taught in English. Students may also enroll in regular university courses taught in Spanish.

Sea Education Association (SEA). Offers a combination land-sea program in marine science and maritime navigation and history with practical seamanship skills and oceanographic research. A six-week sea voyage to the Caribbean or the Canadian Maritime provides hands-on experience.

Asia

China, Hong Kong: Chinese University of Hong Kong. Allows students to experience the dramatic process of integrating two distinct cultures—traditional, Communist China with westernized, capitalist Hong Kong. Classes are taught in English in most arts and sciences majors.

Malaysia, Penang: University of Malaya. Provides students with the opportunity to study in a unique and multicultural Southeast Asian country. Classes are taught in English in many arts and sciences majors.

Singapore, Jurong: Nanyang Technological University (NTU). This program offers traditional arts and sciences courses (taught in English), as well as Malay and Tamil language and culture in southwestern Singapore.

Viet Nam, Ho Chi Minh City: School for International Training. Based at the University of Ho Chi Minh City, this program emphasizes independent field study and travel as well as classroom learning. Classes are taught in English.

Australia/New Zealand

Australia: Various Locations. Students may choose to study at universities located across the continent: Curtin University in Perth, University of Sydney, Monash University in Melbourne, or Bond University in the Gold Coast. Each program offers courses in a variety of arts and sciences disciplines as well as the opportunity to live with Australian students.

New Zealand: Various Locations. Students may study at the University of Canterbury (Christchurch) or the University of Auckland on the North Island. Each offers courses in most majors as well as the opportunity to live and study with New Zealander students.

Europe

Belgium, Leuven: Irish Institute for European Affairs. Parliamentary Internship. Designed to offer students an opportunity to learn about the history, organization, and operation of the European Union. Courses, taught in English, focus on politics, economics, and history. Includes a research internship with a member of the European parliament.

Czech Republic, Prague: Charles University. Focuses on Czech history, politics, literature, and culture in a city known not only for its beauty but also for its vibrancy. All courses are taught in English.

England, Cambridge: University of Cambridge. In this intensive six-week summer program, students choose to study in one of six specialty programs: Humanities and Social Sciences, Art History, History, Medieval Studies, Shakespeare, and English Literature. Teaching is in small seminar classes. Students may also participate in numerous activities and field trips.

England, London: Goldsmiths' College. Offers a wide variety of courses in art, theater, education, English, history, politics, psychology, and sociology through Goldsmiths' regular course catalog. They also have a world renowned Communications Department. Students have the opportunity to live with other Goldsmiths' students.

England, London: The Hansard Scholars Program. Parliamentary Internship. Combines courses in British society and government with an academic internship. Recent sites included the British Parliament, BBC, and other local political agencies. Courses are taught at the London School of Economics.

France, Paris: American University of Paris. Offers students the opportunity to live and study in the heart of Paris. Courses are taught in English and are available in most arts and sciences disciplines.

Hungary, Budapest: Technical University. Allows students to see the dramatic changes occurring in Eastern Europe. The courses, taught in English, focus on the social sciences.

Ireland, Dublin and Belfast: North and South Internship Program. The Institute of Public Administration, Dublin (fall quarter) and/or Queen's University, Belfast (winter quarter): Offers students classes in literature, sociology, political science, and history; the fall quarter includes an internship in the Irish Parliament; the winter quarter includes a short-term internship with a public service organization.

Italy, Florence: SACI. Located in the heart of Florence, Studio Arts Center International is designed for studies in studio art, art history, photography, and architecture. Courses are taught in English.

Spain: University of Alicante and University of Seville. Students may choose to study in one of two historic and beautiful cities. Alicante is for students with a basic knowledge of Spanish—courses are taught in English. In Seville, courses are taught exclusively in Spanish.

Russia

Russia: Various Locations. Offers students the choice of studying in Yaroslavl, Vorenezh, and Vladivostok. Classes, taught in Russian, focus on the cultures, economics, and politics of Russia today.

For more information on the study abroad program contact Todd Rich or Beth Rascoe, Office of International Study Programs, Center for Experiential Education and Academic Advising, One Meserve Hall, 617.373.5162, fax 617.373.7768, or e-mail trich@casdn.neu.edu.

African-American Studies

Robert L. Hall, PhD, *Associate Professor and Chair*

College of Arts and Sciences

Distinguished Professor

Patrick Manning, PhD
History

Professor

Ronald W. Bailey, PhD
Black Studies

Associate Professors

Jordan Gebre-Medhin, PhD
Anthropology

Maryemma Graham, PhD
Literature

William Lowe, MA
Music

Assistant Professors

Leonard L. Brown, PhD
Music

Robin Chandler, PhD
Sociology and Art

Elizabeth B. Cole, PhD
Psychology

Kwamina Panford, PhD
Law, Policy, and Society

Associated Faculty

Oscar Brookins, PhD
Economics

Edward A. Bullins, MFA
Theatre

Donald M. Jacobs, PhD
History

William F. Miles, PhD
Political Science

Peter C. Murrell, PhD
Education

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the field of African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns. Plans for a study-abroad program are under way.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies.

Beginning in 1997, the department will emphasize dual majors in African-American Studies and a range of other arts and sciences departments.

Bachelor of Arts and Bachelor of Science Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; one course on the black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses that will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

American Sign Language–English Interpreting

Dennis R. Cokely, PhD, *Associate Professor and Director*

Lecturers
Alma L. Bournazian, MS
James Lipsky, BS

American Sign Language (ASL) is a language used by large numbers of people in the United States and Canada. By mastering ASL, students gain both access to the culture of Deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to recent federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England.

Bachelor of Science Curriculum

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL-English Interpreting 1, 2, and 3; ASL 1520, Interpreter Role and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, Interpreting Practicum 1; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and CMN 1110, Voice and Articulation.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: CRS 1200, Introduction to Special Education; ED 1302, The Human Services Professions; SOC 1240, Sociology of Human Service Organizations.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 33).

Art and Architecture

Elizabeth C. Cromley, PhD, *Professor and Chair*

Professor
Mardges Bacon, PhD

Associate Professors
Edwin C. Andrews, MFA
Samuel S. Bishop, MFA
Mira Cantor, MFA
Julie M. Curtis, MFA
T. Neal Rantoul, MFA
George H. Thrush, MArch

Assistant Professors
Ann L. McDonald, MFA
Thomas Starr, MFA
Peter H. Wiederspahn, MArch

Lecturers
Cynthia L. Baron, MBA
David A. Conant, MArch
E. Margaret Curley-Clay, MFA
Katheryn M. Firth, MAUD
Elizabeth A. Gibb, MArch
Jeffrey T. Kalin, MPhil
John Kane, BA
Douglas K. Kornfeld, MFA
Mark J. Laughlin, BFA
Wallace F. Marosek, MFA
Mark E. Pasnik, MAUD
Thomas J. Petit, MFA
Neil Rennie, MFA
H. Mark Schatz, MArch
Norma Steinberg, PhD
Lawrence C. Volk, MFA

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, graphic design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Students wishing to be accepted to the art major or minor as internal transfer students must petition the department chair. Acceptance into the major will be based on students having met the department's criteria for admission (see *Arts and Sciences Guidebook*) and availability of space in the program. Petitioners will be notified in April of the department's decision, and accepted students may begin art courses the following summer or fall quarters.

Bachelor of Arts and Bachelor of Science Curriculum

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art Since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in architecture. Leading to a BS degree, which is not a professional degree in architecture. The twelve art electives are replaced by five architectural history courses: ART 1111 and ART 1112, Introduction to World Architecture 1 and 2; ART 1204, Renaissance Architecture; ART 1225 and ART 1226, Modern Architecture 1 and 2. ART 1100, History of Art to 1400 and ART 1101, History of Art Since 1400 are electives.

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1341, 1342, Architectural Design 1 to 6; and ART 1352, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer-Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in graphic design. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Art; ART 1240, History of Graphic Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291,

Intermediate Computer Graphics Workshop; ART 1330, Advanced Visual Communication; and one art history elective and ten open electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Multimedia studies dual major. The multimedia studies dual major (Departments of Music and Art and Architecture) will combine course work in the students' primary disciplines with courses outside their own fields. For these capstone courses, students will work in cross-disciplinary teams developing and delivering original multimedia content. The three areas of specialization in art are: animation, graphic design, and digital photography, which will become available over the next four years.

Concentration in animation: Four requirements in animation concentration: ART 1175, Animation Studio 1; Animation Studio 2; Animation Studio 3; Animation Studio 4; six art and architecture requirements: ART 1100, History of Art to 1400; ART 1101, History of Art Since 1400; ART 1124, Basic Drawing; ART 1131, Visual Studies Foundation 2; ART 1213, Modern Art; ART 1250, Color Theory and Practice; seventeen requirements for multimedia studies: MUS 1100, Introduction to Music; MUS 1170, Music and Technology; MUS 1172, Introduction to Music Recording; ART 1180, Video Basics; ART 1130, Visual Studies Foundation 1; ART 1160, Introduction to Photography; ART 1132, Principles of Graphics; ART 1190, Introduction to Computer Graphics; ART 1171, Animation Basics; six extra-disciplinary: CMN 1451, Foundations of Broadcast Technology; HST 1575, History of Media in America; HST 1494, History and Film *or* HST 1495, Technological Transformations of Society; LNF 1551, Film Theory; Law and Multimedia; Scripting for Interactivity; two capstone Multimedia Projects 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in graphic design: Six requirements in media arts and design: ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1243, Graphic Design 2; ART 1144, Typography 2; ART 1280, Media Graphics *or* ART 1290, Electronic Publishing Design; ART 1244, Graphic Design 3; Interactive Design; six art and architecture requirements: ART 1100, History of Art to 1400; ART 1101, History of Art Since 1400; ART 1124, Basic Drawing; ART 1131, Visual Studies Foundation 2; ART 1213, Modern Art; ART1250, Color Theory and Practice; seventeen requirements for multimedia studies dual major: MUS 1100, Introduction to Music; MUS 1170, Music and Technology; MUS 1172, Introduction to Music Recording; ART 1180, Video Basics; ART 1130, Visual Studies Foundation 1; ART 1160, Introduction to Photography; ART 1132, Principles of Graphics; ART 1190, Introduction to Computer Graphics; ART 1171, Animation Basics; CMN 1451, Foundations of Broadcast Technology; HST 1575, History of Media in America; HST 1494, History and Film *or* HST 1495, Technological Transformations of Society; LNF 1551, Film Theory; Law and Multimedia; Scripting for Interactivity; Multimedia Projects 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in photography: Six requirements in photography concentration: ART 1185, Still Digital Imaging; ART 1195, Intermediate Digital Photography; ART 1230, History of Photography; Fine Arts Digital Photography; Digital Photo Pre-press Production; Digital Photography Thesis; six art and architecture requirements: ART 1100, History of Art to 1400; ART 1101, History of Art Since 1400; ART 1124, Basic Drawing; ART 1131, Visual Studies Foundation 2; ART 1213, Modern Art; ART 1250, Color Theory and Practice; seventeen requirements for multimedia studies dual major: MUS 1100, Introduction to Music, MUS 1170, Music and Technology; MUS 1172, Introduction to Music Recording; ART 1180, Video Basics; ART 1130, Visual Studies Foundation 1; ART 1160, Introduction to Photography; ART 1132, Principles of Graphics; ART 1190, Introduction to Computer Graphics; ART 1171, Animation Basics; CMN 1451, Foundations of Broadcast Technology; HST 1575, History of Media in America; HST 1494, History and Film *or* HST 1495, Technological Transformations of Society; LNF 1551, Film Theory; Law and Multimedia; Scripting for Interactivity; Multimedia Projects 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

General minor. Select any six courses from the departmental curriculum.

Minor in history of architecture. ART 1111, ART 1112, Introduction to World Architecture 1 and 2; ART 1204, Renaissance Architecture; ART 1223, American Architecture; ART 1225, Modern Architecture: The Nineteenth Century; ART 1226, Modern Architecture: The Twentieth Century; and ART 1310, Seminar in Modern Architecture.

Minor in architecture. ART 1111, ART 1112, Introduction to World Architecture 1 and 2; ART 1111, Introduction to World Architecture; ART 1124, Basic Drawing *or* ART 1156, Architectural Drafting; *or* GE 1130, Engineering Design and Graphics; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; *or* ART 1295, Computer Aided Design; *or* ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; Art 1133, Graphic Design 1; and ART 1254, Intermediate Drawing.

Minor in graphic design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

The sophomore portfolio review. As part of the progression through the Department of Art and Architecture, all students are required to assemble and submit a portfolio of their best works from their freshman and early sophomore years for review by the faculty. Evaluation of the student work will be done on a pass/fail basis. In order to proceed to upper level courses in the department, students must pass the Sophomore Portfolio Review.

Behavioral Neuroscience

The behavioral neuroscience major is a unit of academic coordination for undergraduates. It does not have faculty appointments or separate space but does have a head adviser/director and an advisory board made up of the neuroscience faculty of the College of Arts and Sciences. The overall objective of the neuroscience major program is to draw together faculty and students who are interested in this interdisciplinary topic and to provide undergraduates with an education in the field. Behavioral neuroscience focuses on brain mechanisms and how they give rise to behavioral functions in humans and animals. The field combines the disciplines of biology and psychology with a strong background in basic physical sciences and mathematics. The goal is to achieve an understanding of nerve cells, chemical neurotransmission, simple neural circuits and other physiological systems and then to see how they give rise to normal and pathological behavioral functioning. Studies range from the molecular to the molar as seen in the example of a drug that interacts with specific protein molecules or receptors in nerve cell membranes but also can be used to alter behavior. The curriculum prepares students to find employment in allied fields such as the bio-tech industry or to gain entrance to higher degree granting programs in graduate or medical school. For further information on the behavioral neuroscience major, contact Frederick Davis, professor of biology, at 617-373-3076.

Bachelor of Science Curriculum

Psychology: PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211, Behavioral Statistics 1; PSY 1212, Behavioral Statistics 2; PSY 1351, Psychobiology; PSY 1451, Psychopharmacology; PSY 1551, Psychobiology Laboratory.

One course from the following: PSY 1241, Developmental Psychology; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1.

Two courses from the following: PSY 1231, Learning and Motivation 1; PSY 1262, Psychology of Language; PSY 1353, Animal Behavior; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1381, Sensation; PSY 1382, Perception.

Biology: BIO 1100, Principles of Biology 1; BIO 1600, Principles of Biology 1 Lab; BIO 1101, Principles of Biology 2; BIO 1601, Principles of Biology 2 Lab; BIO 1282, Genetics; BIO 1283, Introductory Biochemistry; BIO 1355, Regulatory Cell Physiology; BIO 1655, Regulatory Cell Physiology Lab.

Two courses from the following: BIO 1321, Evolution; BIO 1621, Evolution Lab; BIO 1343, Vertebrate Zoology; BIO 1641, Vertebrate Zoology Lab; BIO 1346, Embryology; BIO 1646, Embryology Lab; BIO 1356, Comparative Vertebrate Anatomy; BIO 1656 Comparative Vertebrate Anatomy Lab; BIO 1452, Comparative Neurobiology; BIO 1473, Systems Physiology; BIO 1677, Systems Physiology Lab; BIO 1474, Neuroethology; BIO 1674, Neuroethology Lab; BIO 1462, General Biochemistry Laboratory; BIO 1463, Cellular Biochemistry 3; BIO 1467, Molecular Biology.

Mathematics and Chemistry: MTH 1106, Functions and Algebra and MTH 1107, Functions and Calculus and MTH 1108, Calculus; *or* MTH 1133, 1134, and 1135, Calculus for Biology Majors 1, 2, and 3; CHM 1111, General Chemistry for the Life Sciences 1; CHM 1122, General Chemistry for the Life Sciences 2B; CHM 1264, Organic Chemistry for Biology Science Majors 1; CHM 1265, Organic Chemistry for Biology Science Majors 2.

Seminar: PSY 1651, Psychobiology *or* BIO 1490, Seminar in Biology.

BS Core Curriculum: For natural science majors, but excluding PSY 1110, PSY 1113, Perspectives in Psychology 1.

Electives: Select ten courses. Recommended courses include: PHY 1201, PHY 1202, and PHY 1203, Physics for the Life Sciences 1, 2, and 3; and two Directed Study courses toward a Senior Honors Project or equivalent.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Science Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1461, General Biochemistry 1; BIO 1462, General Biochemistry Lab; BIO 1463, Cellular Biochemistry 3; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1122, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3 *or* CHM 1264, CHM 1265, Organic Chemistry for Biology Science Majors 1 and 2; CHM 1273, Organic Chemistry for Chemistry Majors 3; and CHM 1381, CHM 1382, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus for Science Majors 1, 2, and 3 *or* MTH 1133, MTH 1134, MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Majors 1, 2, and 3; two quarters of corresponding physics lab courses; four advanced biology and chemistry electives (minimum of one from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 33).

Biology

Edward L. Jarroll, PhD, *Professor and Chair*

Matthews Distinguished University Professor
Phyllis R. Strauss, PhD

College of Arts and Sciences Distinguished Professor
Wendy A. Smith, PhD

Professors
H. William Detrich, PhD
Gwilym S. Jones, PhD
James M. Manning, PhD
Richard L. Marsh, PhD
Charles A. M. Meszoely, PhD
M. Patricia Morse, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD
Carol M. Warner, PhD

Associate Professors
Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Frederick C. Davis, PhD
Charles H. Ellis, Jr., PhD
Helen H. Lambert, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD

Assistant Professors
Donald M. O'Malley, PhD
L. David Smith, PhD

Professors Emeriti
Francis D. Crisley, PhD
Charles Gainor, PhD
Nathan W. Riser, PhD
David C. Wharton, PhD

Adjunct Professors
Bruce B. Collette, PhD
Sergei Kashin, PhD
Kenneth Sebins, PhD

Adjunct Associate Professor
David Carc, MD, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology/microbiology, molecular biology, plant biology, zoology, etc. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middler year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical or predental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Arts Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1211, Environmental and Population Biology; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Functions and Algebra, MTH 1107, Functions and Basic Calculus, and MTH 1108, Calculus (one year); *or* MTH 1133, MTH 1134, and MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1201 and PHY 1202, *or* PHY 1203, Physics for the Life Sciences 1 and 2, *or* 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science and Engineering Students 1 and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1211, Environmental and Population Biology; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Functions and Algebra; MTH 1107, Functions and Basic Calculus; and MTH 1108, Calculus; *or* MTH 1133, MTH 1134, and MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 *or* PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor adviser before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 617-373-2260.

Biomedical Physics

Faculty listed under Physics

At the most basic level, biomedical physics seeks to understand the role of physical processes occurring on molecular, cellular, or macroscopic scales, in vital biological functions, ranging from the extraction of oxygen from the lungs by red blood cells to the generation of complex electrical signals in the brain and nervous system. At the most practical level, biomedical physics examines how physical principles and modern instrumentation techniques can be used in a rapidly increasing number of medical applications, ranging from imaging tissue structures and organ functions, to detecting and curing diseases, to performing sophisticated surgeries.

The biomedical physics major sponsored by the physics department helps students understand the interrelationships between physics, biology, and medicine, at both fundamental and practical levels. Students acquire a strong interdisciplinary training in science. This training combines formal classwork in physics, biology, computer science, and mathematics, with practical seminar courses in medical imaging, medical applications of lasers and optical techniques, and radiation therapy. The latter courses are given by expert practitioners from local hospitals and are designed to help students make the connection between the real-world clinical environment and classroom learning.

Students have the opportunity, through Northeastern's program of cooperative education, to further their educational experience by working in various biotechnology companies, medical instrumentation companies, and local hospitals. Students also have the opportunity to participate in research projects with faculty members doing research in biophysics and biomedical-related areas. Undergraduate research fellowships awarded by the physics department are available for particularly able students.

The biomedical physics major prepares students for a broad range of careers and graduate study options in biomedical-related areas. Students can choose to find direct employment in various industrial or hospital facilities as well as in companies involved in developing and manufacturing medical devices, biomaterials, and instrumentation. They can also choose to attend medical school, to pursue advanced degrees in physics, biophysics, or biomedical engineering, or to enter a professional graduate program in biomedical physics.

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4 and associated labs PHY 1521, PHY 1522, and PHY 1533; PHY 1300, Physics with Computers; PHY 1302, Electric and Magnetic Fields; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551, PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1421, Biological Physics 1; PHY 1423, Medical Physics; PHY 1451, Medical Imaging; PHY 1452, Radiation Therapy; and PHY 1453, Applications of Lasers in Medicine.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, Calculus for Science Majors 1, 2, 3, and 4; CHM 1111, CHM 1122, General Chemistry for Life Science 1 and 2B; BIO 1108, General Biology; BIO 1109, Animal Biology; BIO 1355, Regulatory Cell Physiology; and three additional science electives from those approved for majors in physics, mathematics, computer science, engineering, and biology.

Chemistry

William M. Reiff, PhD, *Professor and Chair*

Matthews Distinguished University Professor
Geoffrey Davies, DSc

Professors
Terry K. Baker, DSc
David A. Forsyth, PhD
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
John L. Roebber, PhD
Paul Vouros, PhD
Philip M. Warner, PhD

Associate Professors
Thomas R. Gilbert, PhD
David J. Jebaratnam, PhD
Alex K-Y Jen, PhD
Graham B. Jones, PhD, D.I.C.
Rein U. Kirss, PhD
Ira S. Krull, PhD
Patricia A. Mabrouk, PhD
Nelly M. Rodriguez, PhD

Assistant Professors
David E. Budil, PhD
Sanjeev Mukerjee, PhD

Laboratory Coordinator
Edward H. Witten, PhD

Professor Emeritus
Alfred Viola, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their course work into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas that have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

The Department of Chemistry offers two degree programs. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

The Department of Chemistry also offers a Bachelor of Science with an Interdisciplinary Option. In this program some of the courses required for a traditional BS in chemistry have been replaced with required and elective courses focused on one of several disciplines, including business administration, education, environmental science, and law and public policy. The options are offered because chemists frequently take jobs that require knowledge and skills not provided by the traditional chemistry major program. The options programs add breadth to the curriculum for chemistry majors while still providing a technical core of math, physics, and chemistry courses. More information about these options are contained in the pamphlet *Options for Chemistry Majors* available from the Chemistry Department.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 *or* MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Advanced Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

Bachelor of Science with an Interdisciplinary Option

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; MTH 1133, MTH 1134, MTH 1135, Calculus 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics 1, 2, and 3; PHY 1501, PHY 1502, PHY 1503, Physics Lab 1, 2, and 3; and two math or science electives and the required and elective courses in the interdisciplinary area.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; or CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

Richard A. Katula, PhD, *Professor and Chair*

Associate Professors
Karen S. Buzzard, PhD
Carl W. Eastman, MA
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professor
Kevin Howley, PhD

Instructor
Elizabeth Threnhauser, PhD

Communication studies offers students a humanities-based, liberal arts education coupled with pre-professional training.

Students who major in communications learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

Students who wish to transfer to the communication studies major must meet the department's criteria for acceptance (see *Arts and Sciences Guidebook*). In addition, space in this program is limited, so students may be admitted on a space-available basis.

Bachelor of Arts and Bachelor of Science Curriculum

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1330, Interpersonal Communication; CMN 1430, Organizational Communication; CMN 1450, Television Studio Production; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three adviser-approved communication studies courses are required to complete the major and, in some cases, CMN 1650, Senior Seminar in Communications.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1300, Communication Theory; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; CMN 1500, Special Topics in Communication Studies; and CMN 1554, Special Topics in Media.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1554, Special Topics in Media; and CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315 Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1500, Special Topics in Communication Studies; CMN 1554, Special Topics in Media; and CMN 1899, Advanced Television Production.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism. Individual programs may be approved through the Communication Studies Department.

Economics

Steven A. Morrison, PhD, *Professor and Acting Chair*

Professors
John Adams, PhD
M. Shahid Alam, PhD
Barbara M. Fraumeni, PhD
Harold M. Goldstein, PhD
Daryl Hellman, PhD
Irwin L. Herrnstadt, PhD
Sungwoo Kim, PhD
Gustav Schachter, PhD
Andrew M. Sum, MA

Associate Professors
Neil O. Alper, PhD
Oscar T. Brookins, PhD
Kamran N. Dadkhah, PhD
Alan W. Dyer, PhD
Gregory Wassall, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and identify policies that contribute to economic stability and progress.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the developing world and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services.

Bachelor of Arts Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1220, History of Economic Thought; ECN 1250, Statistics; and eight other economics courses, of which at least six must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In order to graduate with a BA in economics, a student must earn an average grade of C (QPA = 2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1220.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1250, Statistics; ECN 1260, Problems in Economic Research; and twelve other economics courses, of which at least nine must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

Minor in Environmental Studies Curriculum

In order to graduate with a BS in economics, a student must earn an average grade of C (QPA = 2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1260.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and six other courses in economics, of which at least two must be upper-level (non-Pathway) electives and one must be ECN 1250, Statistics, or equivalent (unless a comparable course is required by the major department). Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

TBA

Professors
James W. Fraser, PhD
Maurice Kaufman, PhD
Mervin D. Lynch, PhD

Associate Professors
Joseph Meier, EdD
Peter C. Murrell, PhD
Irene A. Nichols, EdD

Assistant Professors
Thomas H. Clark, MA
Terry L. Haywoode, PhD

Professors Emeriti
Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
John D. Herzog, PhD
Sandra M. Parker, EdD
Barbara A. Schram, EdD

The Department of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain advanced provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department.

Early Childhood Education and Elementary Education

Students who wish to obtain certification as early childhood or elementary education teachers complete a major in the arts and sciences and enroll in a program of education courses. For specific education program course requirements, students should consult the *1998–1999 College of Arts and Sciences Guidebook.*

Secondary Education

Students seeking high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.

Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.

Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Adolescent Development, Learning, and Education; ED 1104, Learning and the Teaching Process; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Curriculum Development; and ED 1417, Student Teaching and Seminar.

Student Teaching

Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors
Samuel J. Bernstein, PhD
Robert J. Blanch, PhD
Francis C. Blessington, PhD
Irene Fairley, PhD
Wayne Franklin, PhD
Gary Goshgarian, PhD
Guy Rotella, PhD
Michael Ryan, PhD
Herbert L. Sussman, PhD
Arthur J. Weitzman, PhD
Joseph E. Westlund, PhD

Associate Professors
Maryemma Graham, PhD
Kathleen Kelly, PhD
Marina Leslie, PhD
Mary K. Loeffelholz, PhD
Janet Randall, PhD
Bonnie TuSmith, PhD
Susan Wall, PhD

Assistant Professor
Elizabeth C. Britt, PhD

Lecturers
Joseph B. deRoche, MFA
David W. Tutein, MA

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Literary Interpretation; three period courses; two major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and four electives in English.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in creative writing. ENG 1351, Creative Writing; one course from the following: ENG 1356, Drama Workshop; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; ENG 1360, Topics in Writing; and ENG 1362, Publication Arts.

Concentration in literature. One language or writing course from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop.

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; ENG 1126, Backgrounds in English and American Literature *or* ENG 1307, Literary Interpretation; two English courses in literature at the 1200 level or above *or* one course in literature at the 1200 level or above and one linguistics course at any level; and one junior/senior seminar.

Minor in Writing Curriculum

Six courses required, five from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1125, Technical Writing 1; ENG 1350, Writing for the Professions; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Non-Fiction Workshop; ENG 1362, Publication Arts; ENG 1370, Technical Writing 2; ENG 1380, Writing for the Health Professions; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; and one elective.

Minor in Linguistics Curriculum

See page 33.

Minor in Technical Communication Curriculum

See page 33.

Environmental Studies

Professors
Geoffrey Davies, DSc
Chemistry
Gwilym Jones, PhD
Biology
Anthony Penna, DA
History

Associate Professors
Christopher Bosso, PhD
Political Science
Thomas R. Gilbert, PhD
Chemistry
Malcolm D. Hill, PhD
Geology
William D. Kay, PhD
Political Science
Judith Perrolle, PhD
Sociology/Anthropology
Peter S. Rosen, PhD
Geology

Assistant Professor
Daniel Faber, PhD
Sociology/Anthropology

The environmental studies major is an interdisciplinary program designed for students who wish to apply an understanding of both social and scientific issues to the solution of environmental problems. The goal of the major is to enable students to conceptualize and to attack "unstructured problems" (i.e., problems with many more variables than equations, or problems for which there may be no obvious single best solution). This type of problem dominates natural environmental systems; the solutions to environmental problems may require balancing scientific and societal concerns. By the time students graduate, they should be able to identify an environmental problem, develop a plan to address the problem, identify and organize the resources that they would need to solve the problem, and know how to implement a plan to solve the problem.

The major is structured to provide progressive development in skills and knowledge. It is flexible in that it allows latitude in upper-level course choices, selected with the approval of a faculty adviser, to suit individual student interests. Students are strongly encouraged to complete a dual major combining environmental studies and another major; course lists for specific pairings will be available from the faculty or from the College of Arts and Sciences Dean's Office by fall 1998. Students first complete nine environmental studies prerequisite courses and two interdisciplinary environmental core courses: one to help link across two of the science prerequisite courses, and the other to focus on environmental policy making. With approval from faculty advisers, students select a set of eight upper-level electives, participate in a one quarter-hour environmental seminar, and complete a four quarter-hour field experience (which will also satisfy the college's Experiential Education Requirement). The capstone course/senior thesis provides an opportunity to participate with other students in a team-based approach to environmental problem solving.

Bachelor of Arts Curriculum

Prerequisites: SOA 1104/IAF 1104, Cultures of the World *or* SOA 1100, Peoples and Cultures, *or* SOC 1100, Introduction to Sociology; CHM 1105, General Chemistry for the Health Sciences; BIO 1111, Environment and Man; PHL 1140, Social and Political Philosophy *or* PHL 1135, Philosophical Problems of Law and Justice; *one of the following:* ECN 1250, Statistics 1; MTH 1150, Probability, Statistics, and the Computer; POL 1301, Research Methods 1; ECN 1323, Environmental Economics; POL 1110, Introduction to Politics *or* POL 1112/IAF 1112, Introduction to International Relations; GEO 1140, Environmental Geology *or* GEO 1212, Physical Geology; SOC 1146, Environment and Society; HST 1544, Environmental History of the United States; and Environmental Studies Seminar; Interdisciplinary Environmental Science; Making Environmental Policy; choose eight upper-level environmental studies electives with faculty adviser; independent research, internship *or* field training; experiential education requirement; and capstone/senior thesis.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Environmental Studies Curriculum

Students must complete nine quarter-hours in the prerequisites section; the two interdisciplinary environmental core courses, and the one quarter-hour interdisciplinary seminar.

Geology

Peter S. Rosen, PhD, *Associate Professor and Chair*

Professors
Richard H. Bailey, PhD
Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors
Bernard L. Gordon, MS
Martin E. Ross, PhD

Assistant Professor
Patrick M. Colgan, PhD

Geology is an interdisciplinary science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require course work in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, geology and land-use planning, environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, to the Grand Canyon, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the optional co-op plan typically work with local engineering, environmental consulting companies, or with government agencies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation.

Bachelor of Arts in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Geology Curriculum

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; and five geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1100, BIO 1101, Principles of Biology 1 and 2; BIO 1600, BIO 1601, Principles of Biology 1 and 2 Labs; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 *or* BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Environmental Geology Curriculum

GEO 1212, Physical Geology *or* GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning *or* GEO 1442, Water in Environmental Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History

Gerald H. Herman, MA, *Assistant Professor and Acting Chair*

Professors
Ballard C. Campbell, PhD
William M. Fowler, Jr., PhD
Harvey Green, PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Clay McShane, PhD
Anthony N. Penna, DA
Raymond H. Robinson, PhD

Associate Professors
Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD
Christina Gilmartin, PhD

Assistant Professors
Jeffrey Burds, PhD
Adam M. McKeown, PhD
Felix V. Matos Rodriguez, PhD

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers two degree programs: a Bachelor of Arts, for students preparing for graduate work in history or for teaching careers; and the Bachelor of Science, designed for students planning careers in public history fields or in the "new history" areas that require technical understanding of the social sciences.

All history majors are required to take courses in Western or world civilization, American history, and historical methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a seminar in Approaches to History, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to test themselves by doing an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through cooperative education placements, fieldwork, internships, and other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648; *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization since 1648 *or* HST 1102, Western Civilization since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors), and HST 1202, The United States since 1877 *or* HST 1712, The United States since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization Since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1102, Western Civilization Since 1648; HST 1201 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States Since 1877 *or* HST 1712, The United States Since 1877 (Honors); HST 1241, The Historian's Craft; HST 1270, Introduction to Public History; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization Since 1648 *or* HST 1122, World Civilization Since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States Since 1877 *or* HST 1712, The United States Since 1877 (Honors).

Human Services

Gordana Rabrenovic, PhD, *Director and Associate Professor, Sociology/Anthropology and Human Services*

Advisory Committee

Susan Beaton, MA
Human Service Internship Supervisor

Patricia Fetter, PhD
Counseling Psychology, Rehabilitation, and Special Education

Terry Haywoode, PhD
Education/Human Services

Wilfred E. Holton, PhD
Sociology/Anthropology

Maureen Kelleher, PhD
Sociology/Anthropology

Louise LaFontaine, EdD
Counseling Psychology, Rehabilitation, and Special Education

Martha Wengert, MEd
Cooperative Education

Harold S. Zamansky, PhD
Psychology

Professors Emeriti

John D. Herzog, PhD

Barbara A. Schram, EdD

Human services is a behavioral sciences major that includes courses in psychology, sociology, education, political science, economics, counseling, and social sciences. Students take basic foundation courses, skills courses, and complete two intensive fieldwork internships in Boston agencies. The major may lead to careers in many diverse areas of the helping professions or to graduate programs in social work, counseling, rehabilitation, education, and law. Students who major in human ser-

vices select specialization areas such as deaf studies, counseling, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, education, and more. Students prepare for positions in both public and private agencies including: casework in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, in the Fenway Project, which provides student volunteers to community agencies, and Alpha Delta Omega, the national honor society in human services.

Bachelor of Arts Curriculum

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Human Services and Social Science; ED 1302/HS 1101, The Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1001, Economic Problems and Perspectives *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324/HS 1260, Human Services Research and Evaluation; SOC 1240/HS 1240, Sociology of Human Service Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1309/HS 1219, Intervention Strategies for the Human Services; HS 1333, Senior Seminar in Human Services.

Internship. HS 1336 and HS 1337, Field Internship in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences bachelor of arts core curriculum (see page 33).

Bachelor of Science Curriculum

Prerequisite courses. Same as for the Bachelor of Arts curriculum.

Core courses. Same as for the Bachelor of Arts curriculum plus POL 1329, American Social Welfare Policy *or* SOC 1501, Social Policy and Social Intervention, or another social policy course.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization in human services, chosen with the student's academic adviser; ED 1107, Beginning Computer Use *or* COM 1105, Computer Science and Its Applications.

In addition, complete the arts and sciences bachelor of science core curriculum (see page 33), plus another mathematics or science course, or a health-related course.

Specialization in Deaf Studies

Prerequisite, core, and internship courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; *or* ASL 1401, American Sign Language Literature.

Major in Human Services Combined with Elementary Education Program

Students can now major in human services and prepare themselves as beginning teachers at the elementary level, meeting the new requirements in Massachusetts. This program gives students a strong background in psychology, sociology, human services, and other fields of study along with skills in teaching. See a human services adviser or the chair of the Department of Education for the requirements of the program in education.

Minor in Human Services Curriculum

ED 1302, Human Services Professions; ED 1309, Intervention Strategies; HS 1336, Internship in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

International Affairs

Advisory Board
John Adams, PhD
Economics
Timothy Donovan, PhD
Associate Dean, Arts and Sciences
T. Anthony Jones, PhD
Sociology and Anthropology
Harlow L. Robinson, PhD
Modern Languages
David E. Schmitt, PhD
Political Science
Denis J. Sullivan, PhD
Political Science

The major in international affairs (BA) provides students with the opportunity to develop a deep understanding of both regional and global issues. It is intended to prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students wishing to complete the major in international affairs will take seventeen courses; in addition, students must fulfill a Foreign Language Proficiency requirement, an International Experience requirement, and the BA Core Curriculum. Students majoring in international affairs should maintain a minimum 2.75 grade point average until the beginning of their international experience. Current Northeastern students wishing to declare an international affairs major must have a minimum 2.75 grade point average.

Bachelor of Arts Curriculum

Required courses. IAF 1100, Introduction to International Affairs; IAF 1104/SOA 1104, Cultures of the World; IAF 1112/POL 1112, Introduction to International Relations; IAF 1113/POL 1113, Introduction to Foreign Governments; IAF 1122/HST 1122, World Civilization Since 1648; IAF 1300, International Conflict and Negotiation; IAF 1330/ECN 1330, Development Economics; *or* IAF 1190/ECN 1190, The Global Economy; IAF 1400, International Experience Workshop; and IAF 1500, Senior Seminar in International Affairs.

Foreign Language Proficiency is defined as passing the Intermediate 2 level of a foreign language or meeting a comparable criterion approved by the Department of Modern Languages. (This requirement in the major also parallels the language requirement for the Bachelor of Arts degree in the College of Arts and Sciences.)

International Experience requires that students spend at least one term abroad. Students may fulfill this requirement by choosing at least one of three options: (a) study abroad, through enrollment in a Northeastern University study-abroad program or (with prior approval) through another university; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop individually or which may be sponsored by a major department and/or a Northeastern University study-abroad program; the internship may carry academic credit, with proper approval; (c) international co-op, which may be arranged through the Division of Cooperative Education.

Students must also satisfy requirements for the BA Core Curriculum. (The international affairs major is considered part of the social sciences.)

Elective categories. Students must select a total of eight courses from the dual elective categories of *Regional Analysis* and *Global Dynamics and Development.* Four courses must be chosen from each category. Students may choose any four courses from *Global Dynamics and Development.* Students must choose four courses from *Regional Analysis*, with at least three from the same subcategory.

Minor Curriculum

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate. Northeastern students must have a minimum 2.75 grade point average to declare an international affairs minor and must maintain a minimum 2.75 grade point average until the completion of their international experience.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamic and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern

University study-abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international co-op, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category. Students must select two or three courses from *Regional Analysis* and these courses must be chosen from at least two different regional subcategories. All electives must be taken from *outside* the student's major.

***I Regional Analysis*. Africa:** AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization; AFR 1342/POL 1342, Crisis and Conflict in Black Africa; AFR 1402/HST 1623, History of West Africa; AFR 1405/HST 1625, South African History;

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History; HST 1633, Modern China; HST 1634, Contemporary China; HST 1637, Modern Japan; MUS 1183, Music of East Asia; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions; PHL 1293, Eastern Philosophy; POL 1332, Government and Politics of Japan; POL 1371, Government and Politics of China; SOC 1104, Sociology of Japan;

Europe: ART 1204, Renaissance Architecture; ART 1205, Renaissance Art; ECN 1333, European Economic Development; ENG 1652, Twentieth Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society; LNG 1554, Modern German Film and Literature; LNS 1500, Backgrounds of Spanish Culture; LNS 1550, Spanish Civil War in Spanish Film; POL 1306, Politics in Western Europe; POL 1340, Crisis and Change in Central/Eastern Europe; POL 1343, Politics and Violence in Northern Ireland; POL 1347, Russian Politics After Communism; SOC 1105, Society and Culture in Russia and the Former Soviet Union.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of South America, Latin America, and the Caribbean; POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East; POL 1346, Gender in the Middle East.

II Global Dynamics and Development. AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1190/IAF 1190, The Global Economy; ECN 1335, International Economics: Finance; ECN 1336, International Economics: Trade; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business; INB 1735, Import and Export Management; PHL 1130, Ethics: East and West; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam; POL 1309, International Political Economy; POL 1338, Religion and Politics; POL 1355, Ethnic Conflict; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOC 1171, Race and Ethnic Relations: A World Perspective.

Journalism

Nicholas Daniloff, MA, *Professor and Director*

Associate Professors
Charles F. Fountain, MS
William Kirtz, MS
James Ross, MS

Assistant Professors
Belle Adler, MJ
Laurel Leff, MA
Alan Schroeder, MPA

Lecturer
Gladys McKie, MA

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end, the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Bachelor of Arts and Bachelor of Science Curriculum

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1105, Computer-Assisted Reporting; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Reporting; JRN 1440, Design and Graphics; a beat reporting class; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1423, Documentary Production; and one journalism elective.

Additional requirements. ENG 1110, ENG 1111, College Writing 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one additional English or American literature elective; and one political science course. HST 1201, United States to 1877; HST 1202, United States Since 1877; ECN 1001, Economic Problems and Perspectives; and one business management course; MTH 1152, Statistical Thinking; one philosophy course; one history elective; and COP 1135, Professional Development for Journalists; MUS 1109, Introduction to Art, Drama, and Music.

Additional requirements for bachelor of arts. One course in science.

Additional requirements for bachelor of science. Two foreign language courses (at least up to Elementary II level) and four science or computer science courses. Two of the four science courses must be in biology, chemistry, and physics, and at least one of the science courses must be above the elementary level.

Students must also complete the arts and sciences core curriculum (see page 33).

Linguistics

Janet H. Randall, PhD, *Associate Professor and Coordinator of Linguistics Program*

Professors
Irene R. Fairley, PhD
English
Harlan Lane, PhD,
Doc. ès Lettres
Psychology
Joanne L. Miller, PhD
Psychology

Associate Professors
John N. Frampton, PhD
Mathematics
Michael R. Lipton, PhD
Philosophy and Religion
Lynn M. Stephen, PhD
Anthropology

Assistant Professors
Neal Pearlmutter, PhD
Psychology
Fei Xu, PhD
Psychology

Lecturers
Federika Busa, PhD
Computer Science
Benjamin Fortson, PhD
Linguistics

Linguistics is the scientific study of human language. A growing and exciting field, it links to diverse fields including cognitive psychology, philosophy, neuroscience, computer science, artificial intelligence, sociology, language teaching, anthropology, and education. Linguistics and the first five fields listed above are the key components of the emerging field of cognitive science, the study of the structure and functioning of human cognitive processes.

How do children learn to speak? How is language represented in the mind? What do all languages, including sign languages, have in common? How are they different from the communication systems used by whales, bees, and chimpanzees? What do we need to program into a computer in order to converse with it? How might we think about linguistic controversies, including debates about official languages, Ebonics, gender bias, and bilingualism in education? Linguistics attempts to answer each of these questions and covers a surprisingly broad range of topics related to language and communication.

The courses in the linguistics program come from seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology/Anthropology). Each course is cross-listed under LIN and its other departmental prefix, and can be used interchangeably in the two areas. Many linguistics courses can be taken for credit in the honors program.

Linguistics offers a variety of co-ops, including positions at local companies involved in speech recognition and production, as well as in Northeastern's own speech perception and language processing labs. Linguistics majors can also participate in a special foreign internship opportunity, doing research at the Max Planck Institute for Psycholinguistics in the Netherlands.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special education, and robotics.

Bachelor of Arts and Bachelor of Science Curriculum

LIN 1118, Introduction to Language and Linguistics 1; LIN 1215, Symbolic Logic; LIN 1218, Introduction to Language and Linguistics 2; LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1335, Language and Culture; and LIN 1401, Introduction to Syntax.

Second language requirement. Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a second language.

Additional courses. Four from the following (and other related courses by permission): LIN 1119, History of the English Language; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1263; Nonverbal Communication; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499, Psychology of Reading; LIN 1564, Laboratory in Cognition; and LIN 1804, Directed Study.

Lab course. LIN 1562, Laboratory in Psycholinguistics.

Seminar courses. Two from the following: LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics, and LIN 1693, Seminar in Linguistics.

Experiential education practicum course (in fieldwork, interpreting, teaching, etc.). LIN 1888, Experiential Education Directed Study.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

Same as the Bachelor of Arts, except that American Sign Language can count toward the second language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

A total of six courses is required. LIN 1118, Introduction to Language and Linguistics 1; and LIN 1218, Introduction to Language and Linguistics 2.

Plus one from the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; and LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499, Psychology of Reading; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors
Samuel J. Blank, PhD
Bohumil Cenkl, ScD
Stanley J. Eigen, PhD
Terence J. Gaffney, PhD
Maurice E. Gilmore, PhD
Arshag B. Hajian, PhD
Anthony Iarrobino, PhD
Venkatrama Lakshmibai, PhD
Marc N. Levine, PhD
Mikhail Malioutov, PhD
Egon Schulte, PhD
Jayant M. Shah, PhD
Mikhail Shubin, PhD
Gabriel Stolzenberg, PhD
Chuu-Lian Terng, PhD
Jerzy M. Weyman, PhD
Andrei V. Zelevinsky, PhD

Associate Professors
Mark Bridger, PhD
Robert W. Case, PhD
John N. Frampton, PhD
Eugene H. Gover, PhD
Samuel Gutmann, PhD
Solomon M. Jekel, PhD
Christopher K. King, PhD
Donald R. King, PhD
Nishan Krikorian, PhD
N. V. R. Mahadev, PhD
Alex Martsinkovsky, PhD
David Massey, PhD
Robert C. McOwen, PhD
Mark B. Ramras, PhD
Martin Schwarz, PhD
Thomas O. Sherman, PhD
Alexandru I. Suciu, PhD
Gordana G. Todorov, PhD

Assistant Professor
Aidong Adam Ding, PhD

Clinical Assistant Professor of Mathematical Practice
Carla B. Oblas, MS

Lecturers
Robert A. Lupi, MS
Peter J. Philliou, MS
Steven W. Olson, ME

Professors Emeriti
Holland C. Filgo, PhD
Alberto R. Galmarino, PhD
Jack Warga, PhD

Mathematics is of ever-increasing importance to our society and everyday life. It has long been the language of science and technology, and provides a rich source of methods for analyzing and solving problems encountered in the physical world. Today, however, mathematics is essential in virtually all fields of human endeavor, including business, the arts, and the social sciences.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1170, Mathematical Discovery and Computers; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Students may satisfy the arts and sciences experiential education requirement by taking MTH 1360, Seminar in Applied Mathematics, or through student teaching; this applies only to students graduating after the year 2000.

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1170, Mathematical Discovery and Computers; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Students may satisfy the arts and sciences experiential education requirement by taking MTH 1360, Seminar in Applied Mathematics, or through student teaching; this applies only to students graduating in the year 2000.

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser: a) two must be selected from MTH 1200 or higher courses, e.g., MTH 1225, MTH 1226, MTH 1230, *or* MTH 1384 (these two courses may be required by the student's major program); b) the other two must be selected from MTH 1301–1399 and may **not** be among those required by the student's major program (MTH 1384 cannot be counted by many engineering majors and MTH 1301 cannot be counted by computer science majors; MTH 1301 cannot be counted at all if MTH 1230 is already counted in "a," above).

Modern Languages

Harlow L. Robinson, PhD, *Professor and Chair*

Professors
Inez Hedges, PhD
Constance H. Rose, PhD
Stephen A. Sadow, PhD

Associate Professors
Lillian Bulwa, PhD
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Bonnie S. McSorley, PhD
Holbrook C. Robinson, PhD
John Spiegel, PhD

Assistant Professors
Harry Kuoshu, PhD
Robert B. Modee, MA
Rei Okamoto, PhD

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Russian. It is possible to minor in Italian, Russian, or German. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas.

Bachelor of Arts in French Curriculum

LNF 1201, Intensive Review of French, LNF 1202, LNF 1203, and LNF 1204, French Composition Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French Speaking World; LNF 1309, LNF 1310, French Literature of the Nineteenth Century 1 and 2; LNF 1311, 1312, French Literature of the Twentieth Century 1 and 2; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

Bachelor of Arts in Spanish Curriculum

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture *or* LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th Century Literature 1 and 2; LNS 1311, LNS 1312, 20th Century Literature 1 and 2; LNS 1315, Latin American Literature 1; LNS 1505, Cervantes and His Times; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil Wars in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

David D. Sonnenschein, DMA, *Associate Professor and Chair*

Professors
Joshua R. Jacobson, DMA
Judith Tick, PhD

Associate Professors
Leonard L. Brown, PhD
William Lowe, MA
Dennis H. Miller, DMA
Bruce Ronkin, DMA

Assistant Professors
Susan Asai, PhD
Anthony P. DeRitis, PhD
Leon C. Janikian, MM

Lecturers
Marjorie J. Atlas, MM
Paul Beaudoin, MM
Cornelia E. Boniface, MBA
Douglas F. Durant, PhD
Virginia Eskin, BA
Allen G. Feinstein, MM
Karen L. Pokross, EdM
Andrew J. Rega, BM
Jeanne M. Segal, MM
Robert Ward, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study. The department offers four concentrations in the context of a broad liberal arts program.

The music literature and performance concentration combines history with hands-on music making. This concentration leads to a Bachelor of Arts degree and an audition is required. The music literature concentration has an historical orientation and leads to a Bachelor of Arts degree.

The music technology concentration trains students in the use of the newest electronic music technology—both hardware and software—and offers extensive experience in the creation of music using a computer. Students learn techniques such as MIDI sequencing, digital and analog recording, sound design, audio for video, and the latest methods for delivering music over the Internet. Students also study composition for both acoustic and electric instruments. The concentration includes a thorough background in the fundamentals of music, including music theory and history, and leads to a Bachelor of Science degree.

The music teacher program is offered in coordination with the New England Conservatory of Music. This program leads to a Bachelor of Arts degree and to provisional Massachusetts teaching certification. An audition is required for this concentration.

The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in artist management, marketing and promotion, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles.

Bachelor of Arts Curriculum

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS, 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301, MUS 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1241, Piano 1; either MUS 1301 and 1302, Form and Analysis 1 and 2; *or* MUS 1211, Sight Singing and MUS 1250, Conducting; MUS 1461, Applied Music Lessons (every quarter); MUS 1171, Computer Literacy for Musicians; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

Students preparing for the Massachusetts Music Teaching Provisional Certification have to add the following courses: ED 1306, Measurement and Evaluation; ED 1412, Fundamentals of Curriculum Development; (NEC) Music Education Orientation; (NEC) ED 413, Teaching Choral Music; (NEC) ED 417, Teaching Instrumental Music; (NEC) ED 332, Teaching Classroom Music II; (NEC) ED 533, Philosophy of Music Education; (NEC) ED 461, Practice Teaching Seminar; and (NEC) ED 463, Practice Teaching.

Students in both concentrations must participate in at least one Northeastern University performing ensemble every quarter.

In addition, complete the arts and sciences core curriculum (see page 33).

Music teacher program. The Music Department at Northeastern University and the New England Conservatory of Music have launched a coordinated Music Teacher Preparation Program. This comprehensive program, designed to meet the new Massachusetts state certification requirements, will prepare students for the music teaching profession. In accordance with the new state certification requirements, music teachers must earn a BA in music for provisional certification and a master's degree for standard certification. This new undergraduate program is a synthesis of Northeastern University's existing Music Literature and Performance major and a battery of New England Conservatory of Music Education courses as well as practice teaching (practicum). This program will lead to a Northeastern University BA degree in music with Massachusetts teacher certification (recognized by most states). Because enrollments are limited, the program should be considered to be competitive. For additional information and audition requirements for the BA in music, contact: Professor David Sonnenschein, Chair, Music Department, 351 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115.

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1171, Computer Literacy for Musicians; MUS 1421 and MUS 1425, Historical Traditions 1 and 5; any two of the following: MUS 1422, MUS 1423, MUS 1424, Historical Traditions 2, 3, and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry. Choose five music industry

electives from: MUS 1167, Music Administration; MUS 1172, The Recording Studio; MUS 1173, The Recording Studio 2; MUS 1174, Music Production for Radio; MUS 1360, Artist Management; MUS 1362, Music Merchandising; MUS 1366, Copyright Law for Musicians; MUS 1367, Computer Applications in Music Business; ECN 1363, Economics of Art and Culture. Additional electives are planned.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302, Research Methods 1 and 2; MGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Management of Smaller Enterprises; HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in music technology. COM 1100, Fundamentals of Computer Science; MUS 1200, Fundamentals of Music, MUS 1201, MUS 1202, MUS 1203, and MUS 1204, Music Theory 1, 2, 3, and 4; MUS 1107, Principles of Music Literature; MUS 1171, Computer Literacy for Musicians; MUS 1241, Piano Class 1; MUS 1421, MUS 1425, Historical Traditions 1 and 5; MUS 1165, MUS 1166, Music Industry 1 and 2; MUS 1172, Introduction to Music Recording; MUS 1173, Music Recording 2; MUS 1175, Music and Technology 2; Sound Design; Advanced Music Systems; Music Composition; Composition Electronic Instruments; Composition Electronic Instruments 2; select two from the following: MUS 1422, MUS 1423, 1424, Historical Traditions 2, 3, and 4; select any three from the following music technology electives: ART 1171, Animation Basics; ART 1180, Video Basics; MUS 1167, Computer Applications in Music Business; MUS 1174, Music Production for Radio; and Scripting for Interactivity. Students must participate in at least one Northeastern University performing ensemble during at least four quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 33).

Dual major in multimedia studies. The multimedia studies dual major (Departments of Music and Art and Architecture) will combine coursework in the student's primary discipline with courses outside their own field. For their capstone courses, students will work in cross-disciplinary teams developing and delivering original multimedia content. The area of specialization required for students pursuing multimedia studies from the music program is music and technology.

Dual major in multimedia studies with music technology concentration. Music technology students accepted into the dual major in multimedia studies will take all required courses in the music technology concentration plus the following thirteen requirements: ART 1130, Visual Studies Foundation; ART 1132, Principles of Graphics; ART 1160, Introduction to Photography; ART 1170, Animation Basics; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; CMN 1451, Foundations of Broadcast Technology; HST 1494, History and Film; HST 1575, History of Media in America; and LNF 1551, Film Theory. There will be additional requirements. Please check with the Music Technology adviser.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1100, Introduction to Music; MUS 1211, Sightsinging; MUS 1244, Voice Class 1; INT 1110, American Musical Theatre *or* MUS 1132, Introduction to Opera; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Michael Lipton, PhD, *Associate Professor and Chair*

Professor
Stephen L. Nathanson, PhD

Associate Professors
William J. DeAngelis, PhD
Gordon E. Pruett, PhD
Susan M. Setta, PhD

Assistant Professor
Patricia Illingworth, JD, PhD

Lecturers
Margaret C. Huff
Michael C. Meyer, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine, through critical reflection, their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities. The department offers three ways to major in philosophy: the standard major, the concentration in law and ethics, and the concentration in religious studies.

Bachelor of Arts and Bachelor of Science Curriculum

The standard major offers the maximum number of electives to enable students to follow their own interests. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; one of the following four: PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one seminar; and eight philosophy electives (to be selected after consultation with the student's adviser) to bring the total number of quarter hours in philosophy to fifty-two.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following four: PHL 1435, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; PHL 1335, Moral Philosophy; and three philosophy electives.

Concentration in law and ethics. Designed for the philosophy major seeking a career in law, the concentration focuses on the areas of law, social and political philosophy, and applied ethics. The concentration structures the electives so that the student's major serves both the fields of philosophy and those traditionally considered pre-law. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; one of the following four: PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one philosophy seminar; and three electives drawn from the following: PHL 1130, Ethics: East and West; PHL 1135, Philosophical Problems of Law and Justice; PHL 1140, Social and Political Philosophy; PHL 1165, Moral Problems in Medicine; PHL 1170, Business Ethics; three law-related courses to be chosen in consultation with the student's adviser and drawn from social science departments; and three philosophy electives to bring the total number of quarter hours in the major to fifty-two.

Concentration in religious studies. Designed for philosophy majors seeking a career in religious studies, this concentration focuses on providing competency in comparative religion, textual analysis, and methodology. Through the concentration in religious studies, the students will understand the basic theologies, practices, and ethical systems of several of the world's larger faith traditions. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one seminar; PHL 1290, Cults and Sects *or* PHL 1345, Philosophy of Religion; three of the following: PHL 1100, Introduction to Religion: PHL 1275, Eastern Religions; PHL 1280, Islam; PHL 1315, Understanding the Bible; and five philosophy and religion electives to bring the total number of quarter hours in the major to fifty-two.

Physics

Paul M. Champion, PhD, *Professor and Chair*

Matthews Distinguished University Professors
Jorge V. José, PhD
Pran Nath, PhD
Stephen Reucroft, PhD
Fa-Yueh Wu, PhD

College of Arts and Sciences Distinguished Professor
Alain S. Karma, PhD

Professors
Ronald Aaron, PhD
Arun Bansil, PhD
Alan H. Cromer, PhD
David A. Garelick, PhD
Haim Goldberg, PhD
Donald E. Heiman, PhD
Robert S. Markiewicz, PhD
Clive H. Perry, PhD
Carl A. Shiffman, PhD
Jeffrey B. Sokoloff, PhD
Srinivas Sridhar, PhD
Yogendra N. Srivastava, PhD
Michael T. Vaughn, PhD
Eberhard von Goeler, PhD
Allan Widom, PhD

Associate Professors
George O. Alverson, PhD
Marie E. Machacek, PhD
Tomas Taylor, PhD

Assistant Professors
Nathan Israeloff, PhD
Sergey Kravchenko, PhD
J. Timothy Sage, PhD
John D. Swain, PhD
Darien Wood, PhD

Professors Emeriti
Petros N. Argyres, PhD
William L. Faissler, PhD
Marvin H. Friedman, PhD
Michael J. Glaubman, PhD
Walter Hauser, PhD
Bertram J. Malenka, PhD
Eugene J. Saletan, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5, and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, PHY 1224, Physics for Science and Engineering Students 1, 2, 3, and 4, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; PHY 1415, Quantum Mechanics 1; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional science electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

Christopher J. Bosso, PhD, *Associate Professor and Chair*

Professors
Michael A. Baer, PhD
Robert E. Gilbert, PhD
Ronald D. Hedlund, PhD
William F. S. Miles, PhD
Suzanne P. Ogden, PhD
David A. Rochefort, PhD

Matthews University Distinguished Professor
Robert L. Cord, PhD

Distinguished Professor
Michael S. Dukakis, JD

Edward Brooke Professor
David E. Schmitt, PhD

Thomas P. O'Neill Chair in Public Life
William Crotty, PhD

Associate Professors
L. Gerald Bursey, PhD
Minton F. Goldman, PhD
William D. Kay, PhD
Eileen L. McDonagh, PhD
John H. Portz, PhD
Denis J. Sullivan, PhD
Michael C. Tolley, PhD

Assistant Professors
Amilcar A. Barreto, Jr., PhD
William G. Mayer, PhD
Bruce A. Wallin, PhD

Political science majors study the art and science of politics, the structure and functions of government, political behavior, and public policy making. Political science is broad and interdisciplinary by nature, so students will learn about the political and policy dimensions of societies, economic systems, and cultures, today and across time, both in the United States and in other nations.

Political science majors can choose from a wide array of courses in American politics, international relations, comparative politics, public administration, and political theory. Majors can follow a general studies path, selecting from among electives as they go along, or they can pursue more structured and more specialized concentrations in law and legal issues, international and comparative politics, or public policy and administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Most students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as Project Vote Smart, the Model United Nations, the Model Arab League, the student government, or the College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations.

Bachelor of Arts Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought); experiential education requirement; six law and legal issues electives; and one general political science elective.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; POL 1260, Public Policy; and six public policy and administration electives.

Concentration in international relations and comparative politics. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112/IAF 1112, Introduction to International Relations; POL 1113/IAF 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; *or* POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and seven international relations and comparative politics electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought, *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; and six law and legal issues electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; POL 1260, Public Policy; and five public policy and administration electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in international relations and comparative politics. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112/IAF 1112, Introduction to International Relations; POL 1113/IAF 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; *or* POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301 and POL 1302, Research Methods 1 and 2; experiential education requirement; and six international relations and comparative politics electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

James R. Stellar, PhD, *Professor and Chair*

Matthews Distinguished University Professors
Harlan Lane, PhD
Doc. ès Lettres
Joanne L. Miller, PhD

College of Arts and Sciences Distinguished Professors
Judith A. Hall, PhD
Joanne L. Miller, PhD

Professors
Stephen G. Harkins, PhD
Harry A. Mackay, PhD
Adam J. Reeves, PhD
Harold S. Zamansky, PhD

Associate Professors
Martin L. Block, PhD
Perrin S. Cohen, PhD
Rhea T. Eskew, PhD

Assistant Professors
Elizabeth Cole, PhD
C. Randall Colvin, PhD
Denise Jackson, PhD
Franklin Naarendorp, PhD
Neal Pearlmutter, PhD
Fei Xu, PhD

Psychology is the study of human and animal behavior and the ways people think. An interdisciplinary science, psychology includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine.

Bachelor of Arts and Bachelor of Science Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language; PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs *or* two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2.

Two courses from the following: PSY 1241, Developmental Psychology 1; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1. Three courses from the following: PSY 1231, Learning and Motivation; PSY 1262, Psychology of Language; PSY 1351, Psychobiology; PSY 1364, Cognition; and PSY 1381, Sensation *or* PSY 1382, Perception.

Four psychology electives.

Sociology and Anthropology

T. Anthony Jones, PhD, *Associate Professor and Chair*

Matthews Distinguished University Professors
Debra R. Kaufman, PhD
Elliott A. Krause, PhD

College of Arts and Sciences Distinguished Professor
Jack Levin, PhD

Professors
Arnold Arluke, PhD
Winifred Breines, PhD
Michael E. Brown, PhD
Morris Freilich, PhD
Christine Gailey, PhD
Alan M. Klein, PhD
Thomas H. Koenig, PhD
Earl Rubington, PhD
Thomas M. Shapiro, PhD
Lynn Stephen, PhD

Associate Professors
Richard Bourne, PhD
Daniel R. Faber, PhD
Luis M. Falcon, PhD
Wilfred E. Holton, PhD
Maureen Kelleher, PhD
Judith Perrolle, PhD
Gordana Rabrenovic, PhD

Assistant Professor
Matthew O. Hunt, PhD

Professors Emeriti
Carol A. Owen, PhD
Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research.

Bachelor of Arts in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level) in sociology; two advanced courses (1300, 1400, or 1500 level) in sociology; and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level) in sociology; two advanced courses (1300, 1400, or 1500 level) in sociology; and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Sociology Curriculum

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course in sociology.

Bachelor of Arts in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Introduction to Archaeology; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Introduction to Archaeology; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Del Lewis, MFA, *Associate Professor and Chair*

Professor
Edward Bullins, MFA

Associate Professors
Janet L. Bobcean, MFA
Nancy Kindelan, PhD
Jerrold A. Phillips, PhD

Clinical Lecturer
Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—at Northeastern University balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education.

Bachelor of Arts and Bachelor of Science Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1206, THE 1207, Technical Theatre 1 and 2; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; THE 1370, Rehearsal and Performance (general); THE 1370 Rehearsal and Performance (experiential education requirement); and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4.

All theatre majors should select the following courses in their *freshman* year: (fall quarter) THE 1100, Introduction to Theatre Arts and THE 1206, Technical Theatre 1; (winter quarter) THE 1150, Acting 1 (majors section) and THE 1207, Technical Theatre 2; (spring quarter) THE 1800, Practicum in Production 1.

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1370, Rehearsal and Performance (general); two tech/design courses; two performance courses; and two history/literature/criticism courses.

Concentration in production. THE 1208, Technical Theatre 3; THE 1209, Theatrical Drafting; THE 1370, Rehearsal and Performance (production area); two tech/design courses; and two history/literature/criticism courses.

Concentration in performance. THE 1155, Voice for the Theatre; THE 1160, Movement 1; THE 1301, THE 1302, Acting 3 and 4; THE 1370, Rehearsal and Performance (performance area); and two history/literature/criticism courses.

Committed electives. All majors: ART 1101, History of Art Since 1400, should become a committed elective for all majors; ENG 1658, Introduction to Shakespeare, should be taken by majors to fulfill a category III core curriculum requirement. Performance concentration majors must take 4 quarter hours of dance, gymnastics, or fencing.

All students must complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (majors section) (winter quarter); THE 1206, THE 1207, Technical Theatre 1 and 2; THE 1300, Acting 2; THE 1370, Rehearsal and Performance (general); and THE 1800, THE 1801, Practicum in Production 1 and 2. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Music majors who wish to minor in musical theatre must take the following courses: THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section) (winter quarter); THE 1160, Movement 1; THE 1300, Acting 2; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Pharmacy and Health Sciences

TBA, *Dean*
Mehdi Boroujerdi, PhD, *Associate Dean for Pharmacy*
Patrick F. Plunkett, EdD, *Associate Dean for Academic Affairs*
Ena Vasquez-Nuttal, EdD, *Associate Dean and Director of the Graduate School*
Anne M. Sullivan, MEd, *Director of the Office of Student Services*
Nancy P. Warner, MS, *Academic Counselor*
Carol M. Konis, *Assistant to the Dean*
Barry Kass, MBA, *Director of Continuing Education and Development*

The programs in Bouvé College of Pharmacy and Health Sciences* combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated pharmacists and allied health professionals. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care; a cooperative education work program, including a pharmacy externship-internship period and clinical affiliations in physical therapy and other health professions; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the American Association of Colleges of Pharmacy and the Association of Schools of Allied Health Professions.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate.

Sophomore	1.8
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX); and a C or better in professional courses (ATP and PTH). A required course in which an F or W grade is received can be repeated only once. If a grade of D is not considered passing in a professional course, the course can be repeated only once.

Progression requirements—Doctor of Pharmacy Class of 2002–03. Beginning with the Class of 2002–03, a grade of C (2.0) or better must be earned in all courses in the Doctor of Pharmacy program. Students who are administratively released after three quarters in The English Language Center will not be allowed to continue in the Pharmacy Program.

Deficiencies will be cumulative such that a student is warned with two deficiencies, placed on probation with three deficiencies, and dropped from the pharmacy program when the fourth deficiency is earned, *even if previous deficiencies have been remediated.* A student who fails a required course twice will be dropped from the Doctor of Pharmacy Program.

All coursework in the first and second years of the curriculum must be completed satisfactorily in order for a student to progress to the middler year of the curriculum.

Students with a QPA of equal to, or greater than, 2.5 will be able to progress to middler-year standing pending satisfactory completion of all academic and co-op requirements stated herein. Students with QPA below 2.5 but above 2.0, will be warned at the end of the freshman year and will be expected to meet with the Pharmacy Progression Committee prior to the beginning of the sophomore year to discuss their academic progress to date. Students who fail to achieve the required 2.5

*Effective with the appointment of a new dean in 1998–1999, the Bouvé College of Pharmacy and Health Sciences and the College of Nursing will merge. The academic programs will not be affected.

QPA with no deficiencies at the end of the sophomore year will not be allowed to continue in the Doctor of Pharmacy Program.

Students who receive an I (incomplete grade) must file an "Incomplete Clearance Form" with the Student Service Office within three weeks from the date the I is posted. That clearance form must show that the course can be made up some time within the first six weeks of the following quarter. Failure to clear the I grade within the allotted time will result in the course being counted as a deficiency for purposes of progression.

In addition to academic performance, satisfactorily evaluated co-op experience will be required for normal progression. Students who fail to obtain an available co-op position or who receive an unsatisfactory grade will be allowed one opportunity, over a two-quarter time period, to remediate. Students who cannot meet this requirement will be blocked from future registration in the Doctor of Pharmacy Program.

Years 3–6. A student must pass every course in a quarter with a grade of C or better in order to progress to the next quarter. A student who fails to achieve the minimum satisfactory grade will be expected to wait until the failed course is offered again and repeat the course at that time. In the interim, a student may petition to be on co-op or on leave of absence. Students who withdraw from a course (or courses) are also considered deficient for the purpose of progression.

Students who receive an I (incomplete grade) must file an "Incomplete Clearance Form" with the Student Service Office within three weeks from the date the I is posted. That clearance form must show that the course can be made up some time within the first six weeks of the following quarter. Failure to clear the I grade within the allotted time will require the student to repeat the course the next time the course is offered, and the student will not be able to progress in the curriculum.

The cumulative deficiency rule continues to apply such that a student is dropped from pharmacy when s/he fails four courses or fails a required course twice.

Required experiential rotations are considered courses, and the rules stated above apply to them as well. Repeat of a failed rotation is scheduled by the appropriate coordinator and is done on a space-available basis.

In addition to academic performance, satisfactorily evaluated co-op experience will be required for normal progression. Students who fail to obtain an available co-op position or who receive an unsatisfactory grade will be allowed one opportunity, over a two-quarter time period, to remediate. Students who cannot meet this requirement will be blocked from future registration in the Doctor of Pharmacy Program.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, you must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, you must have a minimum quality-point average of 2.0 and have earned a C– or better in all professional courses. To enter clinical studies in the junior and senior years, you must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, pharmacy, and physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year athletic training program is designed for students who are interested in an allied health-care profession specializing in the health care of athletes. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, evaluation, management, treatment, and rehabilitation of athletic injuries. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year and must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students are required to fulfill their clinical education requirements during academic quarters with athletic teams in approved settings at Northeastern University or other colleges, universities, and high schools in the Boston area.

The program is approved by the National Athletic Trainers Association and is in the process of seeking accreditation by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual may apply for Massachusetts licensure as an athletic trainer.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1105, General Chemistry for the Health Sciences 1; ENG 1110, College Writing 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1652, Integrated Human Anatomy and Physiology 2 Lab; CHM 1106, General Chemistry for the Health Sciences 2; and ENG 1111, College Writing 2.
Quarter 3	ATP 1050, Emergency Care of Athletic Injuries; BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; COM 1105, Computer Science and Its Applications; and SOC 1100, Introduction to Sociology.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; PSY 1111, Foundations of Psychology 1; and one elective.
Quarter 5	ATP 1200, Clinical Athletic Training; PHY1202, Physics for the Life Sciences 2; PTH 1310, Clinical Gross Anatomy; and one elective.
Quarter 6	ATP 1300, Lower Extremity Evaluation; ATP 1390, Athletic Training Practicum 1; CPS 1611, Kinesiology; CRS 1314, Introduction to Counseling; and Middler-Year Writing Requirement.
Quarter 7	ATP 1350, Upper Extremity Evaluation; ATP 1360, Applied Neuroscience; PSY 1112, Foundations of Psychology 2; and one elective.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1490, Athletic Training Practicum 2; CPS 1612, Exercise Physiology; and HSL 1468, Overview of Disabilities.
Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; HSL 1286, Nutrition; and one elective.
Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; CPS 1408, Research Design; SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

Mary E. Watson, EdD, RRT, *Associate Professor and Chair*

Associate Professors
Thomas A. Barnes, EdD, RRT
Marilyn A. Cairns, ScD
William J. Gillespie, EdD
Patrick F. Plunkett, EdD, RRT

Assistant Professor
Joseph R. Libonati, PhD

Assistant Clinical Specialists
Joseph A. Curro, MBA, RRT
Eric B. Pepin, EdD, CCP
Annemarie Sullivan, MS

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in cardiovascular technology, exercise physiology, or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization.

Cardiovascular Technology

The program in cardiovascular technology helps prepare students to assist cardiologists in performing diagnostic and interventional cardiac catheterizations, cardiac electrophysiology studies, pacemaker implantations, research protocols, and noninvasive testing such as echocardiography and nuclear imaging.

Before these procedures, the cardiovascular technologist prepares the instrument table, the procedure site, and the patient for the physician while maintaining sterile techniques at all times; attaches instruments for obtaining hemodynamic measurements throughout the procedure; and supplies all desired catheters, wires, sheaths, balloons, and devices needed by the physician.

During the procedures, the cardiovascular technologist is usually responsible for operating monitoring equipment and obtaining vital measurements from the patient, performing calculations from data, and informing physicians of any abnormal measurements or any changes in pressures or electrocardiograms. The cardiovascular technologist must be able to adapt preparations and procedures to meet the requirements of the individual case while maintaining the flexibility to deal with different situations.

All students in the cardiovascular technology specialization study fundamentals of cardiovascular technology, advanced cardiovascular technology, imaging modalities, echocardiography, clinical seminars, and clinical practice courses.

Most cardiovascular technologists work in hospitals as part of the health-care team. Others pursue biomedical research positions in companies or health-care facilities. Graduates are eligible for the registry examination for cardiovascular technology given by the National Society for Cardiopulmonary Technology. Upon successful completion of the exam, an individual is designated a Registered Cardiovascular Technologist (RCVT).

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, cardiopulmonary assessment, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapists are instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the recognition Registered Respiratory Therapist (RRT). The program is accredited by the Commission on Accreditation of Allied Health Education Programs.

Bachelor of Science in Cardiopulmonary Science Curriculum

Quarter 1	CHM 1105, General Chemistry 1; COM 1105, Computer Science and Its Applications, CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, College Writing 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1142, Basic Animal Biology 1; BIO 1642, Basic Animal Biology 1 Lab; CHM 1106, General Chemistry 2; CPS 1112, Cardiopulmonary Sciences Seminar 2; NUR 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; CPS 1115, Basic Life Support and Cardiac Assessment; ENG 1111, College Writing 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

Cardiovascular Technology Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Pharmacology; Electrocardiography; Cardiopulmonary Assessment; Fundamentals of Cardiovascular Technology; Clinical Seminars; Advanced Cardiovascular Technology; Cardiovascular Technology Practicum 1 and 2; Imaging Modalities; Echocardiography; Advanced Cardiac Life Support; and arts and sciences electives.

Exercise Physiology Curriculum

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1 and 2, Research Design; Health Science Education; Cardiopulmonary Assessment; Electrocardiography; Pharmacology; Clinical Practicum 1 and 2; Clinical Seminar; Administrative Rehabilitation Programs; Advanced Cardiac Life Support; and electives.

Respiratory Therapy Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Introduction to Respiratory Care; Professional Practice Laboratories; Clinical Seminars; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2, and 3; Respiratory Care for the Medical and Surgical Patient; Respiratory Care for Critical Patients; Neonatal and Pediatric Respiratory Care; Advanced Cardiac Life Support; and electives.

Dental Hygiene

Linda Hanlon, RDH, BS, MEd, *Dean*
Robyn Olson, RDH, BS, *Assistant Dean*
Judith S. Harvey, CDA, BA, MEd, *Director of Admissions*

The Forsyth School of Dental Hygiene conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is the "preventive oral health professional licensed in dental hygiene, who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health." In other words, the dental hygienist is that member of the oral health team who is responsible for the preventive aspects of dental treatment.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the United States Department of Education.

Application should be made directly to the Forsyth School of Dental Hygiene, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalogue, write that office or call 617-262-5200, extension 211, 212, or 213, FAX 617-262-4021.

Bachelor of Science Curriculum

Quarter 1	CHM 1105, General Chemistry for the Health Sciences 1; DHY 1204, Head and Neck Anatomy; ENG 1110, College Writing 1; and MTH 1106, Functions and Algebra.
Quarter 2	CHM 1106, General Chemistry for the Health Sciences 2; DHY 1101, Dental Hygiene Orientation 1; ENG 1111, College Writing 2; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; DHY 1102, Dental Hygiene Orientation 2; PSY 1111, Foundations of Psychology 1; and one elective.
Quarter 4	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; DHY 1100, Oral Anatomy & Histology; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 5	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 6	DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; DHY 1613, Clinical Dental Hygiene 3; and one Northeastern University elective.
Quarter 7	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and MTH 1152, Statistical Thinking.
Quarter 8	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and one Northeastern University elective.
Quarter 9	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; and one Northeastern University elective.
Quarter 10	DHY 1301, Introduction to Oral Health Research; DHY 1401, Oral Health Gerontology; ENG 1125, Technical Writing 1; and one Northeastern University elective.
Quarter 11	DHY 1402, Advanced Public Health; PAH 1135, Professional Dynamics in the Health Care Delivery System; and two Northeastern University electives.
Quarter 12	DHY 1403, Dental Seminars; DHY 1410, Independent Study; and DHY 1550, Internship.

Associate in Science Curriculum

Quarter 1	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 2	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; and DHY 1613, Clinical Dental Hygiene 3.
Quarter 4	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and ENG 1110, College Writing 1.
Quarter 5	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and PSY 1111, Foundations of Psychology 1.

Quarter 6	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; ENG 1111, College Writing 2; and SOC 1100, Introduction to Sociology.

Health Information Administration

The Health Information Administration Program, formerly offered through the full-time day undergraduate college, is offered through our evening division, University College. The program is offered as an accelerated or part-time program. For further information, call 617-373-2818.

Medical Laboratory Science

Barbara E. Martin, MHP, MT(ASCP), CLS(NCA), *Director and Senior Clinical Specialist*

Professor
James J. Gozzo, PhD

Associate Professors
Judith T. Barr, ScD, CLS(NCA)
Britta L. Karlsson, MS, MT(ASCP), CLS(NCA)

Lecturers
Tenin Abunto, PhD, MT(ASCP)
Ellen Goonan, BS, MT(ASCP)
David G. Grenache, PhD, MT(ASCP)
Frances Sullivan, BA, MT(ASCP)
Elizabeth Szymczak, MS, MT(ASCP)

Assistant Clinical Specialist
Rose Marie Salah, MS, MT(ASCP) Sc

Snell Visiting Professor
Mary Louise Turgeon, EdD, MT(ASCP), CLS(NCA)

Laboratory Coordinator
Judith Baronas, BS, MT(ASCP)

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological, chemical, and medical research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper class students have the opportunity for international placements. Recently students have had co-ops in Sweden and the United Kingdom. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate degree coursework toward subsequent studies for the baccalaureate degree.

Bachelor of Science Curriculum

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; CHM 1111, General Chemistry 1; ENG 1110, College Writing 1; MLS 1101, MLS Orientation 1; and MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; MLS 1102, MLS Orientation 2; PAH 1135, Professional Dynamics in Health Care Delivery; PHY 1201, Physics 1; PHY 1501, Physics 1 Laboratory (optional); and one elective.
Quarter 3	CHM 1122, General Chemistry 2; ENG 1111, College Writing 2; MLS 1104, Laboratory Techniques; PHY 1202, Physics 2; and PHY 1502, Physics 2 Laboratory.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Laboratory; PAH 1210, Anatomy and Physiology; and one elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1172, Basic Immunology; PAH 1212, Anatomy and Physiology; and one or two electives.

Quarter 6	BIO 1282, Genetics; BIO 1660, Genetics Lab; CHM 1221, Analytical Chemistry; MLS 1145, Microbiology; MLS 1245, Microbiology Laboratory; and MLS 1672, Immunopathology.
Quarter 7	BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; ENG 1380, Writing for the Health Professions; MLS 1648, Advanced Microbiology; MLS 1649, Parasitology and Mycology; and one elective (optional).
Quarter 8	MLS 1125, Hematology; MLS 1132, Immunohematology; MLS 1152, Clinical Chemistry; MLS 1225, Hematology Laboratory; MLS 1232, Immunohematology Laboratory; MLS 1661, MLS Education; and one elective (optional).
Quarter 9	MLS 1252, Clinical Chemistry and Instrumentation Laboratory; MLS 1621, Advanced Hematology; MLS 1623, Special Topics in Hemostasis; MLS 1631, Advanced Immunohematology; MLS 1656, Advanced Clinical Chemistry; one elective and one optional elective.
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1573, Immunology 1 MT Applied Study 2; and MLS 1665, Management.
Quarter 11	MLS 1533, Immunohematology MT Applied Study; MLS 1552, MT Clinical Chemistry Applied Study; and MLS 1574, Immunology 2 MT Applied Study.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of Medical Laboratory Science: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor and a baccalaureate degree, the student may be eligible for categorical national certification examination based on relevant work experience or completion of clinical applied studies. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry, who need organic chemistry.

Post-Baccalaureate Certificate Program

The post-baccalaureate certificate program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, clinical chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a categorical area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

Pharmacy

Department of Pharmaceutical Sciences

Mehdi Boroujerdi, PhD, *Professor and Interim Chair*

Professors
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Robert Hanson, PhD
Ban An Khaw, PhD

Associate Professors
Norman R. Boisse, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Barbara L. Waszczak, PhD

Assistant Professors
Mansoor Amiji, PhD
Jonathan Freedman, PhD
Eric J. Mack, PhD

Lecturer
Eugene A. Bernstein, PhD

Department of Pharmacy Practice

Samuel J. Matthews, PharmD, *Associate Professor and Interim Chair*

Professor
Gerald E. Schumacher, PharmD, PhD

Associate Professors
Judith T. Barr, ScD
Robert J. Cersosimo, PharmD
Louise G. Cohen, PharmD

Assistant Professors
Kristin C. Oberg, PharmD
Shirley M. Tsunoda, PharmD

Assistant Clinical Specialists
Todd A. Brown, BS
Jeanne L. Lucich, PharmD
Debra C. Mahfouz, PharmD

Pharmacists promote the safe use of drugs by providing pharmacy care. The expanding role of the pharmacist as a clinical drug consultant to physicians, nurses, health care professionals, and patients has broadened the scope of professional opportunities. Pharmacists prepare and dispense the drugs prescribed by physicians. The roles of clinical drug expert and drug dispensing have given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in management, research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate schools.

The college offers three options for pharmacy education. These curricula offer a blend of academic classroom and co-operative education experiences. The entry-level, co-operative education, six-year Doctor of Pharmacy program opened for entering freshmen in the fall of 1997. In addition, students who entered the Bachelor of Science in Pharmacy program in the fall of 1996 or before may apply for the six-year Doctor of Pharmacy Tracking Option after successful completion of the Bachelor of Science curriculum through quarter 9.

In order to be eligible for any pharmacy degree, a student must have satisfactorily completed all prescribed courses in his or her curriculum, have an overall 2.0 quality-point average (QPA), and must meet the co-operative education, clerkship, externship, and other requirements as stated in the *Bouvé College Undergraduate Student Information Manual* for his or her degree and year of graduation. These undergraduate programs subscribe to the standards established by the American Council of Pharmaceutical Education (ACPE) and the American Association of College of Pharmacy, and all are ACPE-accredited.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

The profession of pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community pharmacy offers the opportunity to combine specialized pharmaceutical training with skills in management, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, health systems, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical companies, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, management, or law.

Doctor of Pharmacy Curriculum (Class of 2003)

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; ENG 1110, College Writing 1; PMD 1100, Introduction to the Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry for the Life Sciences 1; COM 1105, Computer Science and Its Applications; COP 1350, Pharmacy Co-op Seminar 1; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Basic Calculus 2; PMD 1102, Introduction to Pharmacy Practice; and one directed elective.*
Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, General Chemistry for the Life Sciences 2B; ENG 1111, College Writing 2; MTH 1108, Basic Calculus 2 *or* two directed electives.
Quarter 4	CHM 1264, Organic Chemistry for Biology Science Majors 1; PHY 1201, Physics for the Life Sciences 1; one directed elective*; and one open elective*.
Quarter 5	CHM 1265, Organic Chemistry for Biology Science Majors 2; PHY 1203, Physics for the Life Sciences 3; one directed elective*; and one open elective*.

*Directed electives: Students must choose one elective in psychology (PSY) and one elective in economics (ECN) and one multicultural diversity elective from an approved course list available in the Student Service Office, 113 Mugar. Open electives may be chosen from any arts and sciences category, from business (for nonbusiness majors), or from computer science. Restrictions and prerequisites placed by other colleges must be honored.

Additional Professional and Required Courses	Year 3 (3 quarters of coursework and one Co-op)	Biochemistry; Human Physiology 1 and 2; Human Physiology Laboratory; Human Anatomy; Pathophysiology 1 and 2; Health Care Systems; Immunology; Communication Skills for Pharmacy Practice; Medical Microbiology and Antimicrobials; Pharmaceutical Calculations; Dosage Forms; and Pharmacy Care 1.
	Year 4 (2 quarters of coursework and two Co-ops)	Physical Pharmacy; Physical Pharmacy Laboratory; Pharmacology 1, 2, and 3; Principles of Chemistry; Pharmacy Management 1 and 2; Nonprescription Medicine; Integrated Science and Therapeutics 1 and 2; Therapeutic Drug Monitoring and Patient Applications; Pharmacy Care 1 and 2; and two professional elective modules.
	Year 5 (3 quarters of coursework and one Co-op)	Integrated Science and Therapeutics 3-8; Research Methods and Biostatistics; Pharmacy Care 3; Decision Sciences in Pharmacy; Clinical Toxicology Module; Jurisprudence; Pharmacy Ethics; Practice Laboratory 2; and four professional elective modules.
	Year 6	Three quarters of required and elective Pharmacy Experiential Clerkship rotations designed to meet Doctor of Pharmacy requirements.
Bachelor of Science with Doctor of Pharmacy Tracking Option (Class of 1999–2001)	Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics *or* MTH 1107, Functions and Basic Calculus; PHP 1102, The Profession of Pharmacy; and one arts and sciences elective.
	Quarter 2	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; ENG 1110, College Writing 1; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health Care Delivery.
	Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, College Writing 2; MTH 1108, Calculus or an open elective; and one arts and sciences elective.
	Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry 1; PCT 1240, Pharmaceutical Calculations *or* PAH 1202, Anatomy and Physiology 1; PHY 1201, Physics 1; and one arts and sciences elective.
	Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology 1 *or* PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
	Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
	Quarter 6	PCT 1300, Dosage Forms; PCT 1320, Dosage Forms Laboratory; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
	Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1453, Experimental Design in Pharmacology; PCT 1340, Physical Pharmacy; and PCT 1360, Physical Pharmacy Laboratory.
	Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
	Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
		Students admitted in the fall of 1996 or before must satisfactorily complete the curriculum above through quarter 9. During the winter quarter of their junior year, students must elect to complete the Bachelor of Science program or may apply for admission to the Doctor of Pharmacy Tracking Option. Applicants for the track must have a good academic record showing an overall quality-point average (QPA) of 2.75 or better, and must complete an application that includes a personal goals statement and letters of recommendation from faculty and co-op employers. Acceptance to the track is made on a space-available basis.

Fifth Year (Bachelor of Science)

Quarter 10 (Summer/ Winter)	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1302, Pharmacy Administration 1; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Doctor of Pharmacy Tracking Option

For students who entered as freshmen in the fall of 1996 and before (Bachelor of Science class of 2001, 2000, and 1999, who have been, or may be, admitted as tracking students for the PharmD classes of 2002, 2001, 2000, and 1999) and for students transferring to the classes of 2000 and 2001 who may be eligible for the track.

Fifth Year

Quarter 10	PHP 1501, Ambulatory Pharmacy Externship.
Quarter 11	PHP 1615, Clinical Immunology; PMD 1501, Advanced Pathophysiology/Pharmacotherapeutics 1 (formerly PAH 3214); TOX 1300, Clinical Toxicology; and one professional elective.
Quarter 12	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Laboratory; PMD 1502, Advanced Pathophysiology/Pharmacotherapeutics 2 (formerly PAH 3215); PMD 1511, Pharmacy Research and Evaluation (formerly MHP 3201); PMD 1512, Biometrics (formerly PAH 3201).
Quarter 13	PHP 1302, Pharmacy Administration 1; PMD 1503, Advanced Pathophysiology/Pharmacotherapeutics 3 (formerly PAH 3216); PMD 1515, Pharmacoeconomics; and one professional elective.

Sixth Year

Quarter 14	PMD 1600, Institutional Experience; PMD 1601, Clinical Clerkship 1.
Quarter 15	PMD 1605, Clinical Clerkship 2; PMD 1606, Clinical Clerkship 3.
Quarter 16	PMD 1607, Clinical Clerkship 4; PMD 1608, Clinical Clerkship 5.
Quarter 17	PMD 1609, Clinical Clerkship 6; PMD 1610, Clinical Clerkship 7.

A student must successfully complete each section of the Advanced Pathophysiology/ Pharmacotherapeutics sequence in order to progress to the next section (PMD 1501, PMD 1502, PMD 1503) and to the Clerkship portion of the curriculum. Each Clerkship must be completed with a grade of C or better.

Bachelor of Science Option

Fifth Year

Physical Therapy

Meredith H. Harris, EdD, PT, *Associate Professor and Chair*
Ann Noonan, EdD, PT, *Associate Professor and Associate Chair*

Associate Professors
Janice S. Bruckner, PhD
Robert Sikes, PhD
Chad A. Starkey, PhD, *Program Director, Athletic Training*

Assistant Professors
Lorna Hayward, EdD
Timothy Hilliard, PhD
Maura D. Iversen, ScD
Judith Schaechter, PhD
Christine R. Wilson, PhD

Associate Clinical Specialist
Cindy I. Buchanan, MS

Assistant Clinical Specialists
Joseph Cigna, PhD, PT
Xristos Gaglias, MS, AT
Ann Golub, MPH, PT, PCS
Mary J. Hickey, BS, PT, OCS
Sonya L. Larrieux, MA, PT
Susan Lowe, BS, MS, PT
Sheri L. Martin, MS, PT, AT
Mary O'Brien, MPH, PT
Jamie Paz, MS, PT
Donnalee Shain, MS, PT
Nancy H. Sharby, MS, PT
Susan H. Ventura, BS, PT, MEd
Maryann Wilmarth, MS, PT, OCS

Entry-Level MSPT Program

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery.

The first five years of this curriculum result in a Bachelor of Science degree in rehabilitation science. The program in physical therapy culminates at the end of six years in an entry-level Master of Science degree in physical therapy.

Physical therapists evaluate the condition of the patient, plan and execute treatment programs developed to meet the patient's treatment goals, and regularly reassess those treatment goals. Physical therapists develop injury-prevention and health-promotion activities and integrate their treatment plans into the total care plan for the patient. Additional responsibilities of the physical therapist may include health-care planning, supervision of support staff, and community service.

Physical therapists function in a variety of settings, including community and university hospitals; rehabilitation centers; private practices; educational settings; extended care facilities; freestanding outpatient clinics; home health agencies; and community, state, and federal agencies. They are also involved in scientific and clinical research as well as teaching.

Through a commitment to excellence in teaching, research, and service, the Department of Physical Therapy develops individuals who are clinically competent, independent thinking, health-care professionals. The program incorporates the University's Academic Common Experience objectives and encourages the development of communication skills, critical and creative thinking, information literacy, and interpersonal skills. It also emphasizes the importance of developing historical, ethical, aesthetic, and personal perspectives, and of understanding the contexts provided by natural, social, and cultural worlds (including a multicultural understanding). In the classroom, students develop problem-solving skills, manual dexterity, and proficiency in technique and with equipment.

Physical therapy students alternate quarters of academic study with quarters of cooperative education work experience. Students may be employed as physical therapy co-op students with increasing responsibilities commensurate with their academic studies, or they may perform other health-related subprofessional duties. These experiences provide an opportunity for the application and reinforcement of the lessons of the classroom and laboratory. Prior to graduation, students have 18 months of related work experience.

Changes in health care are occurring at a rapid pace. New demands placed on students and educators require a broad team approach and multidiscipline focus. Cross training in health and rehabilitation areas such as physical therapy, speech and language pathology, nursing, pharmacy, and counseling is highly valued by potential employers. The cooperative education and the professional programs in health encourage students to obtain Certified Nursing Assistant (CNA) credentials so they are prepared for cross-training experiences early in their cooperative education experiences. We believe that these experiences will later enrich their discipline-specific training.

In addition to cooperative education, the program includes three eight-week affiliations that are mandated by the American Physical Therapy Association. Clinical affiliations allow the student to practice clinical skills under the supervision of a licensed physical therapist. Clinical sites across the United States, offering a wide range of specialties, participate in our clinical education program. Every effort is made to match students to sites that suit academic need and geographic convenience; however, students should be prepared to travel out of state for a minimum of one affiliation. Availability of a car is also required, as most sites are not accessible by public transportation. All expenses associated with clinical affiliations, including travel and housing, are the responsibility of the student. A very small number of sites offer student incentives including stipends, meals, and housing at low or no cost to the student, but this is becoming increasingly rare.

Students are accepted into the program as freshmen and do not need to reapply. During the freshman year, students take a course in basic physical therapy procedures, so they not only begin to study their major immediately but also are prepared for their cooperative education experience. To continue in the program, students must maintain acceptable standards of scholarship and academic performance as outlined in the student handbook. Students must develop appropriate motor skills, professional behavior, and emotional maturity. Students may be required to purchase in the freshman year a laboratory kit that they will use throughout the curriculum.

The program in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Graduates of the Master of Science in Physical Therapy (MSPT) program are eligible to sit for the Physical Therapy Licensure Examination.

Bachelor of Science in Rehabilitation Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1105, Chemistry for Health Sciences 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus.
Quarter 1 or 2	PTH 1001, Basic Physical Therapy Procedures.
Quarter 2	BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1653, Integrated Human Anatomy and Physiology 2 Lab; CHM 1106, Chemistry for Health Sciences 2; and ENG 1110, College Writing 1.

Quarter 3	BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; ENG 1111, College Writing 2; and PSY 1111, Foundations of Psychology 1.
Quarter 1, 2, or 3	COM 1105, Computer Science and Its Applications; and designated electives.*
Quarter 4	CPS 1615, Exercise Physiology 1 with lab; PTH 1252, Clinical Gross Anatomy 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics for the Life Sciences 1 Lab; and PSY 1112, Foundations of Psychology 2.
Quarter 5	PTH 1253, Clinical Gross Anatomy 2; PHY 1202, Physics for the Life Sciences 2; PTH 1202, Therapeutic Modalities; PTH 1320, Soft Tissue Mobilization; and one multicultural elective.
Quarter 6	PTH 1316, Neuromuscular Physiology; PTH 1325, Clinical Medicine 1; PTH 1330, Clinical Kinesiology; and PTH 1352, Psychosocial Aspects of Illness.

*Designated electives: Students must take one course in three of the following areas: sociology/anthropology, fine arts, and history/political science.

Additional Professional and Required Courses

Pathokinesiology; Neuroanatomy; Clinical Medicine 2; Writing Workshop; Cardiopulmonary Rehabilitation in Physical Therapy; Developmental Basis of Human Performance; courses in Musculoskeletal Evaluation and Treatment; Neurological Evaluation and Treatment; Role of Communication and Health Promotion in Physical Therapy; Clinical Education Seminar; Research Methods; Pediatric Management; Functional Aspects of Aging; Physical Therapy in the Health-Care System; Health Science Education; Issues in Medical Ethics; Physical Therapy Project 1; open electives; professional electives; and Supervised Clinical Education 1.

Graduate Year

Physical Therapy Project 2 and 3; Administration; Pharmacology; Graduate Seminar; Advanced Clinical Processes; graduate elective; Clinical Integration; and Supervised Clinical Education 2 and 3.

Speech-Language Pathology and Audiology

Kevin P. Kearns, PhD, *Associate Professor and Chair*

Professors
Arlene Greenstein, PhD
Mary Florentine, PhD

Associate Professors
Linda Ferrier, PhD
Robert Redden, EdD

Assistant Professor
Therese O'Neil Pirozzi, ScD

Clinical Specialists
Helen Anis, MA
Jane S. Doyle, MS
Denise J. Frankoff, MA
Mary Beth Lannon, EdD
Marjorie North, MA

Research Faculty
Christine Rankovic, PhD

Speech-language pathologists and audiologists are involved with the evaluation and treatment of, and counseling and research in, human communication and its disorders. The speech-language pathology and audiology program is designed to help students develop entry-level competencies that will enable them to function in a preprofessional capacity in educational settings, medical and rehabilitation centers, and private practice clinics. Students will be exposed to a wide variety of communication disorders through observations and participation in activities at the Northeastern University Speech and Hearing Center. Externship in schools, hospitals, or other relevant settings will also broaden students' exposure and prepare them for graduate study or employment.

Speech-language pathologists and audiologists provide clinical services to a full range of communicatively impaired individuals from infants through geriatrics. Speech-language pathologists treat disorders such as developmental language and articulation disorders, voice and resonance problems, stuttering, and language and cognitive impairments due to stroke, head injury, and progressive neurologic diseases. Audiologists specialize in the prevention, identification, assessment, and rehabilitation of hearing disorders. Both congenital and acquired hearing impairments are seen for services by audiologists. They prescribe and dispense hearing aids and instruct individuals in the use of amplification. Undergraduate students take courses in both speech-language pathology and audiology in preparation for advanced training and specialization at the graduate level.

The bachelor of science degree program in speech-language pathology and audiology includes an experiential learning component, a broad-based academic core, and the scientific and clinical coursework necessary for understanding normal and disordered communication. The degree offers preprofessional training for individuals who want to pursue graduate education in speech-language pathology and audiology. Alternately, graduates may be hired as speech and hearing assistants in a variety of clinical settings, or they may pursue other career paths in health care and education.

The speech-language pathology and audiology curriculum is designed to facilitate critical thinking, information literacy, and oral and written communication skills. In addition to coursework in the basic communication sciences, coursework is required in special needs/education, allied health, computer literacy, ethics, multicultural/diversity issues, and psychology. The curriculum provides a solid foundation in speech-language pathology and audiology and arts and sciences, and it is sufficiently flexible to provide students with the opportunity to minor in a related interest area.

A unique aspect of the program is an accelerated graduate provision for students who qualify at the end of year three. Students who have maintained a QPA of 3.25 or better, who have a departmental endorsement, and who have satisfied all graduate program admissions requirements may seek admission to Northeastern University's graduate program in speech-language pathology and audiology. In effect, students who enter the accelerated master's degree track will complete the bachelor of science requirements within the framework of our graduate program. They will be eligible for the master of science and bachelor of science degrees and meet national certification requirements at the end of their fifth year of matriculation. The accelerated track will be selective and a restricted number of students will be admitted each year. The graduate programs in speech-language pathology and audiology and the University's Speech and Hearing Center are fully accredited by the American Speech-Language-Hearing Association.

Class Entrance Requirements

Students in speech-language pathology and audiology are required to obtain a grade of C or better in professional courses. A required course in which a grade below C or a grade of W is received can be repeated only once.

Special Requirements

During the first two years, speech-language pathology and audiology students must achieve a grade of C or better in each of the prerequisite sciences, as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the speech-language pathology and audiology program and department.

Quarter 1	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; ENG 1110, College Writing 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; and SLA 1101, Introduction to Speech and Hearing.
Quarter 2	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; COM 1105, Computer Science and Its Applications; ENG 1111, College Writing 2; and PSY 1111, Foundations of Psychology 1.
Quarter 3	MTH 1150, Probability, Statistics and the Computer; PSY 1112, Foundations of Psychology 2; PSY 1231, Learning and Motivation 1; and NUR 1282, Wellness or Bouvé/allied health elective.
Quarter 4	SLA 1201, Anatomy and Physiology of Vocal Mechanisms; SLA 1300, Language Acquisition; and two electives.
Quarter 5	PHL 1165, Moral Problems in Medicine or ethics elective; SOC 1160, Gender in a Changing Society *or* multicultural/diversity elective; SLA 1301, Phonetics; one elective; and co-op orientation (1 QH).
Quarter 6	CMN 1330, Interpersonal Communication 1 or communication elective; SLA 1200, Hearing Science; SLA 1400, Speech Science; and one elective.
Quarter 7 (Summer)	Co-op
Quarter 8 (Fall)	Co-op
Quarter 9	ENG 1380, Writing for the Health Professions; PSY 1262, Psychology of Language *or* psychology elective; Speech-Language Pathology; and SLA 1460, Neurological Bases of Communication.
Quarter 10	SLA 1303, Introduction to Audiology; SOC 1217, Women, Health, and Social Change *or* diversity/multicultural elective; Speech Pathology 2; and one elective.
Quarter 11	PSY 1364, Cognition *or* psychology elective; SLA 1403, Clinical Procedures, Speech; Clinical Procedures, Audiology *or* elective; PSY 1364, Cognition *or* psychology elective.

Quarter 12	ED 1311, Case Management: Diagnosis and Treatment *or* ED/CRS elective; SLA 3629, Aural Rehabilitation; SLA elective; and one open elective.
Quarter 13	Co-op in speech-language pathology and audiology.
Quarter 14	SLA seminar in speech-language pathology and audiology (with co-op component); SLA 3660, Early Intervention *or* SLA elective; and two electives.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the work force or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies.

Bachelor of Science Curriculum

Quarter 1	BIO 1108, General Biology 1; BIO 1608, General Biology Lab; ENG 1110, College Writing 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, College Writing 2; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.
Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology; and one professional elective.
Quarter 9	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1813, Toxicology Research *or* one professional elective.
Quarter 10	CHM 1432, Instrumental Analysis *or* CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1811, Toxicology Research; and one arts and sciences elective.
Quarter 11	MLS 4341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; TOX 1813, Toxicology Research; and one or two arts and sciences electives.

College of Business Administration

Ira R. Weiss, PhD, *Dean*
James F. Molloy, Jr., PhD, *Senior Associate Dean for Academic Affairs*
William I. Kelly, MS, *Director, Graduate School of Professional Accounting, Interim Director for Graduate Programs*
Brendan D. Bannister, DBA, *Associate Dean for Undergraduate Programs*

Accounting Group

Professors
Sharon M. Bruns, PhD
Paul A. Janell, PhD, *Joseph M. Golemme Professor of Accounting*
Ira R. Weiss, PhD

Associate Professors
Jean C. Bedard, PhD
Julie Hertenstein, DBA
Cynthia M. Jackson, PhD
Mario J. Maletta, PhD
Marjorie Platt, PhD
H. David Sherman, DBA

Assistant Professors
James J. Maroney, PhD
Timothy J. Rupert, PhD

Lecturers
Mystica M. Alexander, JD
Michael D. Cottrill, MAC
Hugh J. Crossland, LLM
Lynn W. Marples, MBA
Peggy L. O'Kelly, MBA

Finance and Insurance Group

Professors
Wesley W. Marple, Jr., DBA
Joseph W. Meador, PhD
Harlan D. Platt, PhD
Jonathan B. Welch, PhD

Associate Professors
Paul J. Bolster, PhD
Jeffery A. Born, PhD
Donald G. Margotta, PhD
Emery A. Trahan, PhD

Assistant Professors
Cetin Ciner, PhD
Mark Kazarosian, PhD
Robert M. Mooradian, PhD
Donald Rich, PhD
Daniel A. Rogers, PhD
Shiawee X. Yang, PhD

Lecturers
Peggy L. Fletcher, MBA
Richard J. Goettle, PhD
Richard S. Swasey, Jr., MBA

Academic Specialist
Steven R. Kursh, PhD

General Management Group

Professors
Robert C. Lieb, DBA
Daniel J. McCarthy, DBA
James F. Molloy, Jr., PhD
Ravi Sarathy, PhD
Heidi Vernon, PhD

Associate Professors
William F. Crittenden, PhD
Raymond M. Kinnunen, DBA
Marc H. Meyer, PhD
Carl W. Nelson, PhD
Ravi Ramamurti, DBA

Assistant Professors
Nicholas Athanassiou, PhD
Louise Kelly, PhD

Lecturers
Richard P. Olsen, DBA
Ronald S. Thomas, PhD

Human Resources Group

Professors
Rae Andre, PhD
David P. Boyd, PhD
Ralph Katz, PhD
Sheila M. Puffer, PhD

Associate Professors
Brendan D. Bannister, DBA
Thomas M. Begley, PhD
Cynthia Lee, PhD
Edward F. McDonough III, PhD
Bert A. Spector, PhD
Francis C. Spital, PhD
Edward G. Wertheim, PhD

Assistant Professor
Judith Y. Weisinger, PhD

Lecturer
Leonard J. Glick, EdD

Management Science Group

Professors
Sangit Chatterjee, PhD
Michael J. Maggard, PhD
Robert A. Millen, PhD
Marius M. Solomon, PhD

Associate Professors
Ramaiya Balachandra, PhD
Robert A. Parsons, MA
Eileen M. Trauth, PhD
Merrill E. Warkentin, PhD
Mustafa R. Yilmaz, PhD
Michael H. Zack, DBA

Lecturers
Richard J. Briotta, MBA
Mohamed Habibullah, PhD

Assistant Professors
Yang W. Lee, PhD
Marianne C. Murphy, PhD

Marketing Group

Professors
Samuel Rabino, PhD
Frederick Wiseman, PhD

Associate Professors
Gloria Barczak, PhD
Dan T. Dunn, Jr., DBA
Fareena Sultan, PhD
Robert F. Young, DBA

Assistant Professors
Bruce H. Clark, PhD
James A. Eckert, PhD
Julie Z. Sneath, PhD

Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to College Writing I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation. Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

Minor in Business Administration

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macroeconomics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Financial Accounting; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs which recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Five-Year Bachelor of Science Curriculum for First Three Quarters

The courses taken in the first three quarters of the five-year program are the same for all concentrations.

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, College Writing 1; and two arts and sciences electives.
Quarter 2	MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, College Writing 2; MSC 1226, Computer-Based Information Systems; and one arts and sciences elective.

Four-Year Bachelor of Science Curriculum for First Five Quarters

The courses taken in the first five quarters of the four-year program are the same for all concentrations.

Quarter 1	MGT 1115, Introduction to Business; non-business elective or MTH 1113, Mathematics for Business and Economics; ENG 1110, College Writing 1, and a non-business elective.
Quarter 2	ECN 1115, Principles of Macroeconomics; MTH 1114, Calculus for Business; and two non-business electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, College Writing 2; MSC 1226, Computer-Based Information Systems; and two non-business electives.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; ENG 1381, Writing for the Professions: Business Administration; and two non-business electives.

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See above.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.

	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
	Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
	Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and one nonbusiness elective.
	Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
	Quarter 9	ACC 1347, Auditing; MGT 1446, Managing Legal, Ethical, and Social Issues; an upper division writing requirement; and an open elective.
	Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
	Quarter 11	Three open electives and a nonbusiness elective.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 95.
	Quarter 6	ACC 1331, Intermediate Accounting 1; ACC 1339, Cost Accounting; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management.
	Quarter 7	ACC 1332, Intermediate Accounting 2; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one nonbusiness elective.
	Quarter 8	ACC 1343, Intermediate Accounting 3; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
	Quarter 9	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; ACC 1345, Accounting Systems; and two open electives.
	Quarter 10	ACC 1347, Auditing; and three open electives.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 95.
	Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.
	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
	Quarter 6	ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; an open elective; and a nonbusiness elective.
	Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and an open elective.
	Quarter 8	ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement.
	Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1441, Operations Management; and an open elective.
	Quarter 10	MGT 1450, Business Policy; ENT 1352, New Venture Creation; and two open electives.
	Quarter 11	ENT 1358, Small Business Institute Field Project; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 95.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one open elective; and one nonbusiness elective.
Quarter 7	ENT 1330, Small Business Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1770, Small Business Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; ENT 1344, Opportunity Analysis and Venture Capital; and an open elective.
Quarter 9	MGT 1450, Business Policy; and four open electives.
Quarter 10	ENT 1352, New Venture Creation; ENT 1358, Small Business Institute Project; and an open elective.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; and two nonbusiness electives.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.
Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Legal, Ethical, and Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 95.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MSC 1441, Operations Management; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2, HRM 1433, Organizational Behavior and Design; one open elective; and one nonbusiness elective.
Quarter 8	FIN 1335, Managerial Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
Quarter 9	FIN 1346, Investment Management; MGT 1450, Business Policy; one finance elective; and two open electives.
Quarter 10	Two finance electives and two open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse work force and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; an open elective; and a nonbusiness elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; human resources management elective; upper division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 95.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; HRM 1433, Organizational Behavior and Design.
Quarter 7	HRM 1332, Introduction to Human Resource Management; FIN 1439, Principles of Finance 2; two open electives; and one nonbusiness elective.
Quarter 8	HRM 1345, Contemporary Labor Issues; MGT 1446, Managing Legal, Ethical, and Social Issues; one HRM elective; and an open elective.
Quarter 9	HRM 1348, Reward Systems; HRM 1349, Selection and Assessment; MGT 1450, Business Policy; and two open electives.
Quarter 10	Human resources management elective and three open electives.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the

humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middler, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433,Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; two open electives; and one nonbusiness elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international nonbusiness elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Legal, Ethical, and Social Issues; upper division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 95.
Quarter 6	INB 1338, Introduction to International Business; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and two open electives.
Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; one international business elective; and two open electives.
Quarter 9	FIN 1759, International Financial Markets; MGT 1450, Business Policy; one business elective; and two open electives.
Quarter 10	INB 1352, Seminar in International Business; one international business elective; and two open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is useful for a student therefore to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433,Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.
Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; an open elective; and a nonbusiness elective.
Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
Quarter 11	TRN 1353, Seminar in Transportation; and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 95.
Quarter 6	TRN 1333, Domestic Transportation System; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; one transportation elective; and one open elective.
Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; and three open electives.
Quarter 9	MGT 1450, Business Policy; TRN 1344, Business/Logistics; one transportation elective; and two open electives.
Quarter 10	TRN 1353, Seminar in Transportation and Logistics; one transportation elective; and two open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to "people problems" in order to stress the importance of developing an effective work force.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.

	Quarter 7	MSC 1341, Information Resource Management; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and a nonbusiness elective.
	Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
	Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; a business elective; an open elective; and upper division writing requirement.
	Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
	Quarter 11	Business elective and three open electives.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 95.
	Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one business elective; and one nonbusiness elective.
	Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
	Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; and three open electives.
	Quarter 9	MSC 1341, Information Resource Management; MGT 1450, Business Policy; MGT 1345, Legal Aspects of Business; and two open electives.
	Quarter 10	HRM 1350, Strategic Management of Human Resources; MGT 1350, Advanced Strategic Management; and two open electives.

Management Information Systems

The concentration in management information systems (MIS) is designed to teach tomorrow's managers how to derive the maximum benefit from state-of-the-art information technology.

The program provides a background in two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track, often referred to as "end-user computing," deals with the direct linkage of decision makers and user-friendly computer facilities.

Through an in-depth examination of case studies, the capstone senior year course, Business Systems Integration, illustrates how management information technology is used to identify and solve an organization's information-related problems.

MIS managers interact frequently with other managers throughout an organization; therefore students are encouraged to complete a dual concentration in one of the functional areas of management.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 95.
	Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
	Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and one open elective.
	Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and one open elective.
	Quarter 7	FIN 1439, Principles of Finance 2; MSC 1335, Telecommunications and Networks; an open elective; and a nonbusiness elective.
	Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.
	Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1336, Business Programming; upper division writing requirement; and a nonbusiness elective.
	Quarter 10	MGT 1450, Business Policy; MSC 1350, Database Management Systems; MSC 1341, Information Resource Management; and one open elective.
	Quarter 11	MSC 1342, Business Systems Integration; and three open electives.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 95.
	Quarter 6	MSC 1335, Telecommunications and Networks; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and a nonbusiness elective.

Quarter 7	MSC 1336, Business Programming; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MSC 1341, Information Resource Management; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
Quarter 9	MSC 1330, Data Management; MGT 1450, Business Policy; MSC 1332, Business Support Systems for Business; and two open electives.
Quarter 10	MSC 1342, Business Systems Integration; and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 95.
Quarter 4	ACC 1111, Financial Accounting; MKT 1435, Introduction to Marketing; MSC 1200, Business Statistics 1; and a nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; two nonbusiness electives; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
Quarter 11	Marketing elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 95.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one open elective; and one nonbusiness elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MKT 1341, Marketing Research; MGT 1446, Managing Legal, Ethical, and Social Issues; one MKT elective; and an open elective.
Quarter 9	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; one MKT elective; and two open electives.
Quarter 10	Marketing elective and three open electives.

International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Bachelor of Science in International Business

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see page 00) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

College of Computer Science

Larry A. Finkelstein, PhD, *Dean*
Agnes H. Chan, PhD, *Associate Dean and Director of Graduate Studies*
Richard A. Rasala, PhD, *Associate Dean and Director of Undergraduate Studies*
Marie P. Hinds, BS, *Director, Student and Administrative Services*

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Betty J. Salzberg, PhD
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William D. Clinger, PhD
Robert P. Futrelle, PhD
Carole D. Hafner, PhD
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Ronald J. Williams, PhD
Bryant W. York, PhD

Assistant Professors
Ibrahim M. Matta, PhD
Rajmohan Rajaraman, PhD
Boaz Patt-Shamir, PhD

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices which support the development of high quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education.

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.7
Middler	1.9
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook.*

Minor in Computer Science

This minor is particularly valuable to non-computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1140, Calculus for Science Majors 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1141, Calculus for Science Majors 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, College Writing 2; MTH 1142, Calculus for Science Majors 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1243, Calculus for Science Majors 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG 1125, Technical Writing 1; and one sub-area or general elective.
Quarter 8	COM 1205, Software Design; MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; and one computer science elective.
Quarter 9	MTH 1387, Probability 1; two computer science electives; and one sub-area or general elective.
Quarter 10	COM 1390, Algorithms; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; and three sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1140, Calculus for Science Majors 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1141, Calculus for Science Majors 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, College Writing 2; MTH 1142, Calculus for Science Majors 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Design; MTH 1243, Calculus for Science Majors 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and MTH 1240, Chaos and Fractals.
Quarter 6	COM 1350, Automata and Formal Language; MTH 1387, Probability; and two sub-area or general electives.
Quarter 7	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.

	Quarter 8	COM 1102, Functional Programming and Applications; ENG 1125, Technical Writing 1; one sub-area or general elective; and one computer science elective.
	Quarter 9	MTH 1301, Linear Algebra; two computer science electives; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1140, Calculus for Science Majors 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1141, Calculus for Science Majors 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, College Writing 2; MTH 1142, Calculus for Science Majors 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; one general elective; one science elective; and one arts and sciences core course.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science elective.
	Quarter 6	COM 1390, Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG middler-year writing requirement; and two arts and sciences core courses.
	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the second year)	Quarter 1	ENG 1110, College Writing 1; MTH 1140, Calculus for Science Majors 1; one science elective; and one arts and sciences core course.
	Quarter 2	MTH 1141, Calculus for Science Majors 2; one general elective; one science elective; and one arts and sciences core course.
	Quarter 3	ENG 1111, College Writing 2; MTH 1142, Calculus for Science Majors 3; one general elective; and one science elective.
	Quarter 4	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; MTH 1137, Discrete Mathematics 1; and two arts and sciences core courses.
	Quarter 5	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1240, Chaos and Fractals; and two arts and sciences core courses.
	Quarter 6	COM 1201, Algorithms and Data Structures 2; COM 1130, Computer Organization and Design; one general elective; and one arts and sciences core course.
	Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG middler-year writing requirement; and one arts and sciences core course.
	Quarter 8	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one general elective.
	Quarter 9	COM 1358, Analysis of Programming Languages; one computer science elective; one general elective; and one arts and sciences core course.

	Quarter 10	Two computer science electives; one general elective; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Four-Year Bachelor of Arts Curriculum	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1140, Calculus for Science Majors 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1141, Calculus for Science Majors 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structure 2; ENG 1111, College Writing 2; MTH 1142, Calculus for Science Majors 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; one science course; and two arts and sciences core courses.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1240, Chaos and Fractals; and one science course.
	Quarter 6	COM 1358, Analysis of Programming Languages; one general elective; and two arts and sciences core courses.
	Quarter 7	COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
	Quarter 8	ENG middler-year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*
Robert D. Croatti, AB, *Associate Dean for Academic Operations and Programs*
Lester W. McCullough, Jr., BA, *Assistant Dean for Academic Services*
Robert E. Fuller, MA, *Assistant Dean for Student Administrative Services*
Stephanie R. Weinstein, BS, *Academic Counselor*

Professors
Edith E. Flynn, PhD
Nicole F. Rafter, PhD

Associate Professors
Frank A. Schubert, JD
Wallace W. Sherwood, LLM

Schulman Professor
Harvey Burstein, JD

Assistant Professors
Nanette Graham, PhD
John F. McDevitt, MPA
Michael Shively, PhD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its kind. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors of the criminal justice field.

The college has a unified undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains. Building on a solid foundation of required courses focusing on law, criminology, administration of justice, and research tools, the curriculum allows students to tailor their elective coursework, in such areas as homicide, terrorism, victims, juvenile justice, security, courts, and corrections, to suit their own professional interests. In addition, students take a variety of courses in other parts of the University, in such topic areas as computer science, English, math, history, economics, political science, sociology, and psychology.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections. Students may also elect not to specialize, but instead to span the broadest possible coverage of the field.

In the policing and security emphasis students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units. These career-oriented experiences help students to better understand the theory and research presented in their classes.

The college maintains close ties to criminal justice agencies in the community, such as the Boston Police Department and the Office of the Attorney General, and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system. In addition, the college cooperates with the mayor's office and a number of private corporations in helping to run various community-based anti-crime programs. The college faculty also has a strong voice and participates actively in research and policy-making at a national and international level. Besides a variety of major research projects, the college houses the *Journal of Quantitative Criminology*, a leading international journal of research in criminology and criminal justice.

Class Entrance Requirements

Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	1.9
To graduate	2.0

Graduation Requirements

Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.

Transfer Credit

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

Bachelor of Science Curriculum

Quarter 1	CJ 1001, Critical Issues in Criminal Justice 1; CJ 1151, Introduction to Law and the Legal Process 1; ENG 1110, College Writing 1; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CJ 1002, Critical Issues in Criminal Justice 2; COM 1105, Computer Science and Its Applications; POL 1110, Introduction to Politics; PSY 1112, Foundations in Psychology 2; and SOC 1110, Introduction to Sociology.
Quarter 3	CJ 1101, Administration of Criminal Justice; CMN 1116, Public Speaking; ENG 1111, College Writing 2; and POL 1111, Introduction to American Government.
Quarter 4	CJ 1201, Criminology; one criminal justice diversity requirement; one math/science requirement 1; and one history requirement 1.
Quarter 5	CJ 1251, Introduction to Criminal Law; ECN 1000, Economic Problems and Perspectives; POL 1318, State and Local Government; and one history requirement 2.
Quarter 6	CJ 1252, Criminal Due Process; CJ 1453, Criminal Justice Research Methods; ENG 1350, Writing for the Professions; and one math/science requirement 2.
Quarter 7	CJ 1454, Criminal Justice Statistics; one criminal justice elective; one non-criminal justice elective; and one philosophy requirement.
Quarters 8–11	32 quarter hours of criminal justice electives and 32 quarter hours of non-criminal justice requirements.

College of Engineering

Allen L. Soyster, PhD, *Dean*
Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*
Yaman Yener, PhD, *Associate Dean and Director, Graduate School of Engineering*
C. W. P. Finn, PhD, *Director of the School of Engineering Technology and the Lowell Institute School*
Cynthia Snow, MA, *Assistant Dean for Administration*
David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*
Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*
Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college helps students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil, electrical, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. A program of study for this option is arranged on an individual basis with a faculty adviser. A set of courses related to biomedical engineering is also available.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification in an engineering discipline are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

Bachelor of Science/ Master of Science Joint Degree Program

The departments of electrical and computer engineering and mechanical, industrial, and manufacturing engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Class Entrance Requirements

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

Graduation Requirements

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university must complete at least 48 quarter hours at Northeastern University immediately preceding graduation to be eligible to receive the Bachelor of Science degree.

Bachelor of Science Curriculum for First Three Quarters

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1110, College Writing 1; GE 1001, Introduction to Engineering; GE 1101, Engineering Problem Solving and Computation; MTH 1140, Calculus for Science Majors 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1111, College Writing 2; GE 1002, Introduction to Engineering Cooperative Education; GE 1102, Engineering Problem Solving with Application Software; MTH 1141, Calculus for Science Majors 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1103, Engineering Design; MTH 1142, Calculus for Science Majors 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Fine, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors

Albert Sacco, Jr., PhD
George A. Snell Professor of Engineering
Ronald J. Willey, PhD
John A. Williams, PhD
Donald L. Wise, PhD,
Cabot Corporation Professor of Chemical Engineering

Associate Professors

Gilda A. Barabino, PhD
Bernard M. Goodwin, ScD
Richard R. Stewart, PhD

The goal of the chemical engineering program is to offer students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new products such as wonder drugs, materials that improve life on earth, and systems that make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, but also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies that touch our lives. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge towards fully professional levels.

Bachelor of Science Curriculum

Quarters 1–3	See page 111. (In Quarter 3 replace PHY 1523 with CHM 1138, General Chemistry Lab.)
Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1143, Calculus for Science Majors 4; and one social science/humanities elective.
Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing.
Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil and Environmental Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors
Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Paul H. King, PhD

Associate Professors
Dionisio Bernal, PhD
Peter G. Furth, PhD
Richard J. Scranton, SM
Thomas C. Sheahan, ScD
Ali Touran, PhD
Irvine W. Wei, PhD

Assistant Professors
Akram N. Alshawabkeh, PhD
Fernando R. Miralles-Wilhelm, PhD
Ajiboye F. Oluokun, PhD
Sara Wadia-Fascetti, PhD

Professor Emeritus
Kenneth M. Leet, ScD

Adjunct Professor
Sidney J. Wartel, JD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

In addition to the basic program in civil engineering, the department offers an option in environmental engineering. This option allows students who wish to specialize in environmental engineering to gain a stronger background in related environmental sciences.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams.

Bachelor of Science in Civil Engineering Curriculum

Quarters 1–3	See page 111.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1143, Calculus for Science Majors 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1250, Steel Design 1; CIV 1310, Fluid Mechanics; and MTH 1230, Linear Algebra.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	MIM 1366, Dynamics for Civil Engineers; two technical electives; and one social science/humanities elective.
Quarter 9	CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1665, Professional Issues for Civil Engineers; MIM 1215, Engineering Economy; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

Environmental Engineering Concentration Curriculum

Quarters 1–3	See page 111.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1143, Calculus for Science Majors 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	One engineering breadth elective; one environmental science elective; and two technical electives.
Quarter 9	CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1665, Professional Issues for Civil Engineers; and MIM 1215, Engineering Economy.
Quarter 10	CIV 1350, Environmental and Hydraulics Lab; one environmental science elective; one social science/humanities elective; and one general elective.
Quarter 11	CIV 1370, Air Pollution; CIV 1395, Environmental Design Projects; one technical elective; and one social science/humanities elective.

Electrical and Computer Engineering

Arvin Grabel, ScD, *Professor and Interim Chair*

Professors
Soeren Buus, PhD
Chung Chan, PhD
Anthony J. Devaney, PhD
Samuel Fine, SM, MD
Sarma S. Mulukutla, PhD
Sheila Prasad-Hinchey, PhD
Sheldon S. Sandler, PhD
Martin E. Schetzen, ScD
Philip E. Serafim, ScD
Michael B. Silevitch, PhD
Carmine Vittoria, PhD

Associate Professors
David Brady, PhD
Dana Brooks, PhD
Jill D. Crisman, PhD
Jeffrey A. Hopwood, PhD
Vinay Ingle, PhD
Mieczyslaw M. Kokar, PhD
Miriam E. Lesser, PhD
Hanoch Lev-Ari, PhD
Elias S. Manolakos, PhD
Nicol E. McGruer, PhD
Stephen W. McKnight, PhD
David J. McLaughlin, PhD
Ramachandran Raghavan, PhD
Carey M. Rappaport, ScD
Masoud Salehi, PhD
Bahram Shafai, ScD
Aleksandar M. Stankovic, PhD
Ioannis Stavrakakis, PhD
Gilead Tadmor, PhD
Man-Kuan Vai, PhD
Paul M. Zavracky, PhD

Assistant Professors
David R. Kaeli, PhD
Bradley Lehman, PhD
Lisa McIlrath, PhD
Waleed Meleis, PhD
Eric Miller, PhD

Lecturers
Jack I. Hanania, PhD
Norman C. Poirier, MS
Jacob Shekel, ScD

Professor Emeritus and Principal Research Scientist
John G. Proakis, PhD

The components of the information age—global communication systems, computers and chips, and the software that runs them—are made possible through the effort of electrical and computer engineers (ECEs). So are pacemakers, magnetic resonance imaging, and the recent mission to Mars. Today, ECEs are developing concepts and working to translate these ideas into the next generation of products, from computers and safe, energy-efficient vehicles, to radar that can detect unexploded land mines from the air, and microrobots that diagnose disease from inside the body.

Most ECEs work in the traditional areas of communications: computation and control and the components required to realize such systems. They are involved in design and product development, testing and quality control, sales and marketing, and manufacturing. Other ECEs use their problem-solving skills in areas as diverse as bioengineering and health care, electronic music, meteorology and experimental psychology. Some graduates utilize their ECE background to have successful careers as physicians, financial analysts, attorneys, and entrepreneurs.

Successful engineers need to organize and adapt information to solve problems. They also must work effectively in teams and communicate well. The ECE major develops these skills and provides the appropriate technical background for a successful career. The core of the curriculum consists of electronic circuits and devices, computer architecture and software design, electromagnetics, and system analysis and design. These are based on courses in mathematics, physics, and computer applications. English, technical writing, and other humanities and social science courses round out the program and help build communication skills.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuits analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, and digital signal processing.

In addition to the standard electrical engineering program, the department offers a concentration in computer engineering. Based on a common core program, the concentration provides for more depth of study during the last two years. Computer engineering allows specialization in both designing digital computers and integrating them within larger systems for communications, resource management, and automatic control. In the cooperative work phase of the program, the student's level of responsibility grows as s/he gains theoretical and technical knowledge through academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers.

Bachelor of Science in Electrical Engineering Curriculum

Quarters 1–3	See page 111.
Quarter 4	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; MIM 1245, Materials Science; MTH 1143, Calculus for Science Majors 4; and one social science/ humanities elective.
Quarter 6	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ECE 1363, Electromagnetic Field Theory 1.

	Quarter 7	ECE 1332, Linear Systems 1; ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Fields Lab; and ENG 1125, Technical Writing.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; MIM 1270, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; MTH 1384, Probability; and one technical elective (level 1).
	Quarter 9	ECE 1355, Communication Systems 1; two technical electives (level 1); and one social science/humanities elective.
	Quarter 10	ECE 1501, Capstone Design 1; two technical electives (level 1 or level 2); one technical elective (level 2); and one social science/humanities elective.
	Quarter 11	ECE 1502, Capstone Design 2; two technical electives (level 2); and one social science/humanities elective.
Bachelor of Science in Electrical Engineering, Computer Engineering Concentration Curriculum	Quarters 1–3	See page 111.
	Quarters 4–7	Same as electrical engineering.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1383, Computer Engineering 3 and ECE 1238, Microprocessor Laboratory; MIM 1245, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; and MTH 1384, Probability.
	Quarter 9	ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab; ECE 1355, Communication Systems 1; one technical elective (level 1); and one social science/humanities elective.
	Quarter 10	ECE 1384, Computer Engineering 4; ECE 1501, Capstone Design 1; one technical elective (level 1); one technical elective (level 1 or 2); and one social science/humanities elective.
	Quarter 11	ECE 1502, Capstone Design 2; one technical elective (level 1 or 2); one technical elective (level 2); and one social science/humanities elective.

General Engineering

Advisory Committee
Arvin Grabel, ScD, *Electrical Engineering, Chair*
Peter Furth, PhD, *Civil and Environmental Engineering*
Mohamad Metghalchi, ScD, *Mechanical Engineering*
Ronald F. Perry, PhD, *Industrial Engineering*
Donald L. Wise, PhD, *Chemical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering.

Bachelor of Science Curriculum	Quarters 1–3	See page 111. (Replace CHM 1131 and CHM 1132 with social science/humanities electives.)
	Quarter 4	MTH 1143, Calculus for Science Majors 4; one basic science elective; one engineering science elective; and one social science/humanities elective.

Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.
Quarter 6	ENG 1340, Writing Workshop; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Mechanical, Industrial, and Manufacturing Engineering

John W. Cipolla, Jr., PhD, *Donald W. Smith Professor of Engineering and Chair*

Professors
George G. Adams, PhD
Thomas P. Cullinane, PhD
Alexander M. Gorlov, PhD
Ronald R. Mourant, PhD
Richard J. Murphy, PhD
Hamid Nayeb-Hashemi, PhD
John N. Rossettos, PhD
Allen L. Soyster, PhD
Mohammad E. Taslim, PhD
Yaman Yener, PhD
Ibrahim Zeid, PhD

Associate Professors
Teiichi Ando, PhD
Nasser Fard, PhD
Surendra M. Gupta, PhD
Olusegun J. Ilegbusi, PhD
Gregory J. Kowalski, PhD
Yiannis A. Levendis, PhD
Emanuel S. Melachrinoudis, PhD
Achille Messac, PhD
Mohamad Metghalchi, ScD
Uichiro Narusawa, PhD
Ronald F. Perry, PhD
Gerard Voland, PhD

Assistant Professors
James C. Benneyan, PhD
Jacqueline A. Isaacs, PhD
Sagar V. Kamarthi, PhD
Bruce Wilson, PhD

Adjunct Professors
Gerald G. Kleinstein, PhD
Michael A. Delichatsios, PhD

Professor Emeritus
Thomas E. Hulbert, MS

Senior Research Engineer
Joseph T. Blucher, PhD

Senior Research Scientist and Professor (Emeritus)
Welville B. Nowak, PhD

The Department of Mechanical, Industrial, and Manufacturing Engineering offers two accredited programs leading to a Bachelor of Science in Industrial Engineering and a Bachelor of Science in Mechanical Engineering.

Industrial Engineering

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise.

The program in industrial engineering offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering workstations by the senior year.

Bachelor of Science in Industrial Engineering Curriculum

Quarters 1–3	See page 111.
Quarter 4	ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics; MIM 1240, Materials Science; MIM 1280, Thermodynamics 1; and MTH 1223, Calculus for Engineering Majors 4.
Quarter 5	MIM 1212, Probabilistic Analysis for Engineers; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics; MTH 1230, Linear Algebra for Engineers; MIM 1420, Computers and Information Systems; and MIM 1320, Work Design.
Quarter 7	MIM 1312, Statistics; MIM 1325, Operations Research 1; one technical elective; and one social science/humanities elective.
Quarter 8	ECE 1171, Electrical Engineering 1; MIM 1430, Manufacturing Systems and Techniques; MIM 1522, Human-Machine Systems; and one social science/humanities elective.
Quarter 9	ENG 1125, Technical Writing; MIM 1410, Digital Simulation Techniques; MIM 1425, Operations Research 2; and one open elective.
Quarter 10	MIM 1501, Design Project 1; MIM 1510, Production and Inventory Control; MIM 1516, Quality Assurance; and one technical elective.
Quarter 11	MIM 1502, Design Project 2; two technical electives; and one social science/humanities elective.

Mechanical Engineering

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment.

Bachelor of Science in Mechanical Engineering Curriculum	Quarters 1–3	See page 111.
	Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; MIM 1240, Materials Science; MIM 1280, Thermodynamics 1; and MTH 1223, Calculus for Engineering Majors 4.
	Quarter 5	MIM 1212, Probabilistic Analysis for Engineers; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; and MTH 1225, Differential Equations (Engineering) 1.
	Quarter 6	ENG 1340, Writing Workshop; MIM 1300, Measurement and Analysis; MIM 1355, Strength of Materials 1; MIM 1375, Fluid Mechanics; and MTH 1230, Linear Algebra.
	Quarter 7	MIM 1356, Strength of Materials 2; MIM 1360, Dynamics; MIM 1370, Heat Transfer; and MIM 1380, Thermodynamics 2.
	Quarter 8	MIM 1400, Mechanical Engineering Computation and Interpretation; MIM 1445, Materials Processing *or* ECE 1171, Electrical Engineering 1; MIM 1450, Mechanical Design; and one social science/humanities elective.
	Quarter 9	MIM 1440, Mechanical Behavior of Materials *or* ECE 1171, Electrical Engineering 1; MIM 1455, Mechanical Vibrations; MIM 1475, Thermal Design; and one social science/humanities elective.
	Quarter 10	MIM 1501, Design Project 1; two technical electives; and one social science elective.
	Quarter 11	MIM 1502, Design Project 2; two technical electives; and one social science/ humanities elective.

Part-Time Evening Engineering

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil and environmental, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact 220 Snell, 617-373-2185. The program coordinator is Caryn Vigoda, MEd.

Part-Time Evening Curriculum for Bachelor of Science

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1101, Problem Solving and Computation and MTH 1140, Calculus for Science Majors 1.
	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1141, Calculus for Science Majors 2.
	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1142, Calculus for Science Majors 3.
Second Year	Fall Quarter	MTH 1143, Calculus for Science Majors 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
	Winter Quarter	MTH 1225, Differential Equations (Engineering) 1; and PHY 1222, Physics 2.
	Spring Quarter	GE 1103, Engineering Design; PHY 1223, Physics 3; and PHY 1523, Physics 3 Lab.

Part-Time Evening Curriculum for Bachelor of Science in Civil and Environmental Engineering

Third and Fourth Years: CIV 1340, Environmental Engineering 1; CIV 1510, Materials; CIV 1511, Materials Lab; CIV 1620; Engineering Measurements; MIM 1212, Probabilistic Analysis for Engineers; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; MIM 1268, Dynamics 1; MIM 1354, Strength of Materials; MIM 1374, Fluid Mechanics; MTH 1230, Linear Algebra for Engineers; and two technical electives.

	Fifth and Sixth Years		CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1240, Concrete Design 1; CIV 1250, Steel Design 1; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental and Hydraulic Design Lab; CIV 1395, Environmental Design Projects; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; one general elective; and three technical electives. *Technical electives*: CIV 3607, Traffic Engineering; CIV 3642, Transportation Planning; ECE 1171, Electrical Engineering 1; MIM 1241, Materials Science; MIM 1270, Thermodynamics; and PHY 1224, Physics for Engineering Students 4.
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, College Writing 1; ENG 1111, College Writing 2; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
Part-Time Evening Curriculum for Bachelor of Science in Electrical Engineering	Third Year	Fall Quarter	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; and PHY 1224, Physics 4.
		Winter Quarter	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; and MIM 1245, Materials Science.
		Spring Quarter	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1.
	Fourth Year	Fall Quarter	ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab.
		Winter Quarter	ECE 1332, Linear Systems 1; and MIM 1364, Mechanics for Electrical Engineers *or* MIM 1270, Thermodynamics.
		Spring Quarter	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; and MTH 1384, Probability.
	Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1; and one technical elective (level 1).
		Winter Quarter	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab; and one technical elective (level 1).
		Spring Quarter	ECE 1355, Communication Systems 1; and one technical elective (level 1).
	Sixth Year	Fall Quarter	One technical elective (level 1); and one technical elective (level 2).
		Winter Quarter	ECE 1501, Capstone Design 1; one technical elective (level 1); and one technical elective (level 2).
		Spring Quarter	ECE 1502, Capstone Design 2; and one technical elective (level 2).
		Summer Quarters	During the summer quarters students are expected to take ENG 1110, College Writing 1; ENG 1111, College Writing 2; five adviser-approved social science/humanities electives; and ENG 1125, Technical Writing.

Technical electives (level 1). ECE 1228, Energy Devices Lab; ECE 1235, Control Systems Lab; ECE 1238, Microprocessor Lab; ECE 1308, Physical Electronics; ECE 1343, Electronic Design 1; ECE 1370, Electric Energy Devices; ECE 1383, Computer Engineering 3: Microprocessor-Based Design; ECE 1420, Control Systems; and ECE 1471, Elements of Power Systems.

Technical electives (level 2). ECE 1230, VLSI System Design Lab; ECE 1231, Power Systems Lab; ECE 1234, Digital Signal Processing Lab; ECE 1351, Special Topics in IC Design; ECE 1384, Computer Engineering 4: Computer Organization and Design; ECE 1455, Communication Systems 2; ECE 1456, Digital Signal Processing; ECE 1458, Communication Networks; ECE 1486, Numerical Methods and Computer Applications; ECE 1472, Power System Analysis; and MTH 1351, Functions of a Complex Variable 1.

Computer Engineering Concentration

Required technical electives: ECE 1383, Computer Engineering 3 (level 1) and ECE 1238, Microprocessor Laboratory; ECE 1384, Computer Engineering 4 (level 2); and ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab (level 2).

Part-Time Evening Curriculum for Bachelor of Science in Mechanical Engineering

Third and Fourth Years

ENG 1340, Writing Workshop; MIM 1212, Probabilistic Analysis for Engineers; MIM 1240, Materials Science; MIM 1250, Engineering Mechanics; MIM 1280, Thermodynamics 1; MIM 1300, Measurements and Analysis; MIM 1355, Strength of Materials 1; MIM 1356, Strength of Materials 2; MIM 1360, Dynamics; MIM 1370, Heat Transfer; MIM 1375 Fluid Mechanics; MIM 1380, Thermodynamics 2; and MTH 1230, Linear Algebra for Engineers.

Fifth and Sixth Years

ECE 1171, Electrical Engineering 1; MIM 1215, Engineering Economy; MIM 1387, Thermal Design; MIM 1400, Mechanical Engineering Computation and Interpretation; MIM 1450, Mechanical Design; MIM 1455, Mechanical Vibrations; MIM 1501, MIM 1502, Design Project 1 and 2; one materials elective; and two technical electives.

Summer Quarters

During the summer quarters students are expected to take ENG 1110, College Writing 1; ENG 1111, College Writing 2; ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; four adviser-approved social science/humanities electives, and one technical elective.

School of Engineering Technology

C. W. P. Finn, PhD, *Director*
Roy Dalsheim, MEd, *Assistant Director*
Rasma Galins, *Assistant Director*

Professor
Samuel Fine, MD
Electrical Engineering Technology

Associate Professors
William E. Cole, PhD
Mechanical Engineering Technology
Eric W. Hansberry, MS
Design Graphics
George F. Kent, MS, MBA, PE
Mechanical Engineering Technology

Associate Academic Specialists
Vincent K. Butler, MS
Computer Technology
Leonard F. Dow, MS
Electrical Engineering Technology

Assistant Academic Specialist
Kang Sun, PhD
Computer Technology

Lecturers
Jerome Tapper, BS, PE
Electrical Engineering Technology
Joel R. Weinstein, BS
Computer Technology

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

Part-Time Evening and Weekend Programs

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-373-2500 (voice), 617-373-8526 (TTY), or 617-373-2501 (FAX).

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.7
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, refer to the School of Engineering Technology bulletin, available at 120 Snell Engineering Center.

Minor in Computer Technology

To qualify for a minor in computer technology, the student must complete the following six courses and one laboratory. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: CT 1311, "C" Language; CT 1330, Data Structures; CT 1345, Assembly Language; CT 1340, Software Engineering; CT 1381, Operating Systems; CT 1393, UNIX.

Minor in Electrical Engineering Technology

To qualify for a minor in electrical engineering technology, the student must complete the following five courses and three laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: EET 1151, Circuit Analysis 1; EET 1152, Circuit Analysis 2; EET 1324, Circuit Lab 1; EET 1325, Circuit Lab 2; EET 1311, Digital Electronics 1; EET 1312, Analog Electronics 1; EET 1323, Electronics Lab; EET 1330, Energy Conversion; or EET 1377, Control Engineering 1.

Minor in Mechanical Engineering Technology

To qualify for a minor in mechanical engineering technology, the student must complete the following six courses and two laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: MET 1301, Mechanics A; MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1373, Fluid Mechanics; MET 1388, Measurements and Analysis; MET 1340, Thermodynamics A; MET 1380, Materials A; MET 1391, Tech Lab A.

To obtain credit for a minor in engineering technology, students must file a petition form with the School of Engineering Technology in 120 Snell Engineering Center. Interested students should confer with an adviser as soon as possible. Advisers are Director C. W. P. Finn and Mr. Roy Dalsheim, 120 Snell, 617-373-2500.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School or Embry Riddle, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets.

Bachelor of Science Curriculum

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, College Writing 1; GET 1105, Computer Applications for Tech; and MTH 1194, Calculus 2.
Quarter 2	ENG 1111, College Writing 2; GET 1170, Engineering Graphics 1; PHY 1191, Physics for BSET 1; PHY 1196, Physics BSET Laboratory 1; and one liberal arts elective.

Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1195, Calculus 3; PHY 1192, Physics for BSET 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	EET 1320, Electricity and Electronics 1; GET 1104, Introduction to Product Design; MET 1301, Mechanics A; PHY 1198, Physics BSET Laboratory 3; and one liberal arts elective.
Quarter 5	MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1373, Fluid Mechanics; and one liberal arts elective.
Quarter 6	ENG 1125, Technical Writing; MET 1340, Thermodynamics A; MET 1380, Mechanical A; and MET 1388, Measurement and Analysis.
Quarter 7	MET 1333, Design Lab; MET 1381, Mechanical Design B; one technical elective; and two liberal arts electives.

Computer Technology

Vincent K. Butler, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for technical inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, College Writing 1; GET 1102, Introduction to Engineering Technology; GET 1105, Computers Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, College Writing 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1196, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	CT 1150, Computer Organization; GET 1100, Computer Programming for Engineering Technology; MTH 1194, Calculus 2; PHY 1193, Physics for BSET 3; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	CT 1311, Programming with C++ Language; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1195, Calculus 3.
Quarter 6	CT 1330, Data Structures; CT 1335, Numerical Methods; EET 1152, Circuit Analysis 2; and EET 1311, Digital Electronics 1.
Quarter 7	CT 1340, Software Engineering Design; CT 1381, Operating Systems; ENG 1125, Technical Writing; and one liberal arts elective.
Quarter 8	CT 1345, Assembly Language; CT 1346, Assembly Language Lab; CT 1374, Introduction to CPU Hardware; CT 1380, Data Communications; and one liberal arts elective.

Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1369, Computer Logic; CT 1370, Computer Laboratory 1; CT 1375, CPU Architecture; and CT 1480, Local Area Networks 1.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; CT 1371, Computer Laboratory 2; one technical elective; and one liberal arts elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; CT 1372, Computer Laboratory 3; one technical elective; and one liberal arts elective.

Electrical Engineering Technology

Leonard F. Dow, MS, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, College Writing 1; GET 1102, Introduction to Engineering Technology; GET 1105, Computer Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, College Writing 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1196, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics for BSET 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	EET 1151, Circuit Analysis 1; GET 1100, Computer Programming for Engineering Technology; MTH 1194, Calculus 2; PHY 1193, Physics for BSET 3; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	EET 1152, Circuit Analysis 2; EET 1324, Circuits Laboratory 1; MET 1319, Mechanics; MTH 1195, Calculus 3; and one liberal arts elective.
Quarter 6	EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1312, Analog Electronics 1; EET 1325, Circuit Laboratory 2; and EET 1360, Engineering Analysis.
Quarter 7	EET 1313, Analog Electronics 2; EET 1314, Digital Electronics 2; EET 1323, Electronics Lab; EET 1354, Circuit Analysis 4; and ENG 1125, Technical Writing.
Quarter 8	EET 1310, Electrical Measurements; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one liberal arts elective.
Quarter 9	ECN 1115, Principles of Macroeconomics; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one liberal arts elective.
Quarter 10	EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; one technical elective; and one liberal arts elective.
Quarter 11	EET 1329, Advanced Electronics Laboratory 3; EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; and one liberal arts elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, College Writing 1; GET 1102, Introduction to Engineering Technology; GET 1105, Computer Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, College Writing 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1996, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics for BSET 2; and PHY 1997, Physics BSET Laboratory 2.
Quarter 4	EET 1320, Electricity and Electronics; GET 1104, Introduction to Product Design; MET 1301, Mechanics A; MTH 1194, Calculus 2; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1380, Materials A; and MTH 1195, Calculus 3.
Quarter 6	ENG 1125, Technical Writing; MET 1314, Stress Analysis A; MET 1340, Thermodynamics A; and MET 1388, Measurement and Analysis.
Quarter 7	ECN 1115, Principles of Macroeconomics; GET 1200, Visual Basics; MET 1303, Mechanics C; MET 1315, Stress Analysis B; and MET 1391, Technology Laboratory A.
Quarter 8	MET 1341, Thermodynamics B; MET 1393, Technology Laboratory C; MET 1396, Machine Shop; one technical elective; and one liberal arts elective.
Quarter 9	GET 1356, Engineering Economy; MET 1373, Fluid Mechanics; MET 1392, Technology Laboratory B; one technical elective; and one liberal arts elective.
Quarter 10	MET 1330, Mechanical Design A; MET 1343, Heat Transfer; one technical elective; and one liberal arts elective.
Quarter 11	MET 1331, Mechanical Design B; MET 1333, Design Lab; one liberal arts elective; and one open elective.

College of Nursing

Eileen H. Zungolo, MEd, EdD, RN, *Dean*
Carole A. Shea, MS, PhD, RN, CS, FAAN, *Associate Dean and Director of Graduate School*
Lea A. Johnson, MS, MSN, RN, *Assistant Dean of Administration*
Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*

Associate Professors
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Lynn Babington, PhD
Michelle Beauchesne, MS, DNSc, RN, PNP
Olivia M. Breton, MEd, RN
Margery M. Chisholm, MS, EdD, RN, CS
Mary Anne Gauthier, MSN, EdD, RN
Patricia J. Hollen, MS, PhD, RN
Dorett Hope, MSEd, EdD
Elizabeth M. Howard, MS, PhD, RN, ANP
Barbara Kelley, MS, MPS, EdD, RN, PNP
M. Marcia Lynch, MSN, DNSc, RN
Peggy Matteson, MS, PhD, RN
Patricia Maguire Meservey, MS, PhD, RN
Carol A. Patsdaughter, MSN, PhD, RN
Susan J. Roberts, MS, DNSc, RN, ANP
Mary Suzanne Tarmina, MS, PhD, RN, FNP
Mary E. Wilcox, MS, RN
M. Delaine Williamson, MS, MPH, RD
Rachel Zachariah, DNSc, MS, RN

Assistant Professors
Anne Bateman, MSN, PhD, RN
Margaret H. Christensen, PhD
Rosanna DeMarco, MS, PhD, RN
Carol Glod, MS, PhD, RN, CS
Margaret A. Mahoney, MS, PhD, RN
Kathleen Miller, MS, EdD, AN, ANP
Abraham N. Ndiwane, MS, EdD, RN

Associate Clinical Specialists
Martha E. Griffin, MSN
Ann M. Kennedy, MS
Carolyn O'Brien, MS, RN, ANP
Pamela Whitting, MS, RN

The College of Nursing* offers a Bachelor of Science in Nursing program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, community health centers, schools, and homes. The college aims to provide all students—including those with diverse backgrounds and changing career goals—with a broad-based education that will foster ongoing personal and professional growth.

Nursing is both a science-based process and a caring art. The curriculum offers instruction in the sciences with opportunities in the humanities. Since nursing practice focuses on promoting, preserving, and restoring the health and well-being of individuals, families, groups, and communities across the life span, the curriculum emphasizes a community-based primary care approach, which starts in the freshman year and builds throughout the program. This approach requires knowledge, skills, and attitudes related to health care that are comprehensive, culturally sensitive, continuous, effective, compassionate, and collaborative. Because the vast majority of people's lives are spent in the community, a significant part of the clinical program takes place in the community where people live, work, eat, rest, play, vote, and pray. Recognizing the equally important need to prepare nurses to care for ill clients in institutions, the program provides ample opportunities for nursing practice in hospitals, rehabilitation centers, and long-term care facilities. The curriculum is capped by courses that enable students to put leadership and management skills into action, and to synthesize the complete role of the professional nurse in a clinical practicum.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives them the opportunity to integrate the theory and practice of nursing in selected settings. Through more than seventy community and institutional health-care agencies in Greater Boston, and across the country, students gain experience in providing nursing care to a variety of clients and families. Students learn that nurses have major roles in wellness and health promotion, acute care, and long-term care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows our graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The college subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

*Effective with the appointment of a new dean in 1998–1999, the Bouvé College of Pharmacy and Health Sciences and the College of Nursing will merge. The academic programs will not be affected.

Class Entrance Requirements

The minimum overall quality-point averages (QPA) listed are required at year's end for students to advance to the next level or to graduate.

Freshman	1.6
Sophomore	2.0
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

These averages reflect the minimum requirements for advancement; the faculty of the college highly recommends that students achieve higher grades in order to avoid academic difficulties as they progress through the program.

In addition, a grade of 2.0 or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1162, BIO 1163, and BIO 1164. The QPA for these science courses must be 2.0 before a student can enter the sophomore year. Other standards for progress, such as the minimum science QPA for the sophomore year, are published in the *College of Nursing Undergraduate Student Handbook* available at 211 Robinson Hall.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titre and immunization for measles, mumps, rubella, and tetanus. Hepatitis B, PPD, and a chicken pox titre are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the approved school uniform in some clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the clinical courses must have access to a car to travel to assigned agencies.

Graduation Requirements

The College of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. The faculty has designed a curriculum to prepare nursing students for health care practice that addresses common goals to improve our nation's health. Degree candidates must complete all prescribed courses, a minimum of 180 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the college are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Nursing. Degree requirements and the year of graduation for a student who does not make academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The College of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 60 quarter hours of transfer credits that are appropriate to curriculum requirements. These credits must include two anatomy and physiology courses (with labs) and one chemistry course (with lab) and reflect a minimum overall QPA of 2.5. A microbiology course (with lab) is strongly recommended. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of two quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and six months.

RN to BSN Option

The college accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree into the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through the development of a portfolio to validate prior learning. The RN to BSN curriculum option has been revised to reflect the need for community-based primary care learning experiences with emphasis on management and leadership. Students entering the program in fall 1998 will participate in course offerings and program requirements that are designed to increase flexibility and facilitate learning for working nurses.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Anatomy and Physiology 1; BIO 1652, Anatomy and Physiology 1 Lab; CHM 1107, Basic Chemistry for the Nursing Professional; ENG 1110, College Writing 1; and MTH 1101, Applications of Algebra.
Quarter 2	BIO 1163, Integrated Anatomy and Physiology 2; BIO 1653, Anatomy and Physiology 2 Lab; COM 1105, Computer Science and Its Applications; COP 1370, Introduction to Nursing Career Management; ENG 1111, College Writing 2; and NUR 1110, Nursing Health Assessment.

Quarter 3	BIO 1164, Integrated Anatomy and Physiology 3; BIO 1654, Anatomy and Physiology 3 Lab; PSY 1111, Foundations of Psychology 1; NUR 1102, Introduction to Human Nutrition; NUR 1107, Nursing Process and Skills; and COP 1370, Introduction to Nursing Career Management 2.
Quarter 4	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; NUR 1206, Promoting Healthy Childbearing and Childrearing; and NUR 1307, Influences of Health and Illness.
Quarter 5	NUR 1202, Pathophysiological Concepts for Clinical Nursing; NUR 1208, Promoting Healthy Adulthood and Aging; and PCL 1306, Pharmacodynamics 1.
Quarter 6	ENG 1350, Writing for the Professions; PCL 1307, Pharmacodynamics 2; PHL 1165, Moral Problems in Medicine; and SOC 1100, Introduction to Sociology.
Quarter 7	NUR 1308, Promoting Health Restoration in Adults; and one humanities elective.
Quarter 8	NUR 1306, Promoting Health Restoration in Children; one history elective; and one free elective.
Quarter 9	NUR 1408, Promoting Mental Health Restoration; SOC 1320, Introduction to Statistical Analysis; and one elective.
Quarter 10	NUR 1406, Promoting Healthy Communities; NUR 1502, Introduction to Research in Nursing; and one elective.
Quarter 11	ECN 1130, Health Care and Medical Economics; NUR 1507, Comprehensive Nursing Practicum; and NUR 1508, Managing and Leading in Nursing.

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Independent Study; Wellness; and Women's Health Choices and Decisions.

School of General Studies

The School of General Studies (SGS) is designed for students who need help in strengthening their basic skills while they take the required freshman-year coursework in English, mathematics, and social and laboratory sciences.

The program carefully monitors student participation in small classes. The program also provides participants with help in clarifying their academic and career goals.

Through the combination of a carefully prescribed curriculum and the attention of faculty whose expertise is in developmental education, students follow a program that fits their individual needs. These same faculty teach the majority of the courses taken by SGS students, provide advice, and participate in a "House Plan" in which faculty members share information on each student's progress.

The program not only helps SGS students in their ability to do college-level work, but also allows them to consider several different areas of study before selecting a major. Students in this school are regular degree candidates with an undeclared major and can enter a number of majors in the University's day colleges as sophomores.

In preparation for gaining sophomore status, SGS students follow one of four curriculum tracks: arts and sciences *or* undecided, business, criminal justice, and health/science. Students may change either their intended major or curriculum track through the winter quarter of the freshman year without falling behind.

Students have access to all physical education facilities and co-curricular programs, and they are encouraged to make use of the SGS Peer Tutoring Program, the Academic Assistance Center, and the math and writing centers. As for all Northeastern students, the Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, SGS students must earn a quality-point average of 2.0 or higher and successfully complete a minimum of forty-four programmed credits, as well as required courses. The College of Business Administration requires that students earn at least a 1.8 in the four core courses: ECN 4601, ENG 4014, MGT 4110, and MTH 4040.

For entrance to the College of Nursing, College of Computer Science, and School of Engineering Technology, students complete a few additional science requirements during the freshman year. The Bouvé College of Pharmacy and Health Sciences offers the following programs to students who have successfully completed the appropriate SGS curriculum: cardiopulmonary sciences, medical laboratory science, speech-language pathology and audiology, and toxicology. Students may also continue their degree programs in University College.

SGS students who do not meet the requirements for sophomore status in their intended majors may be eligible to return as "repeating" or "continuing" freshmen and satisfy specific requirements to complete the freshman year in their particular program.

Tuition and Fees

Tuition and fees for the School of General Studies are the same as for students in the full-time day programs.

Arts and Sciences, Criminal Justice, or Undecided Track

Quarter 1	ED 4003, Integrated Language Skills, A; ENG 4013, Fundamentals of English 1; MTH 4010, Mathematical Preliminaries 2*; and SOC 4010, Principles of Sociology 1 *or* HST 4110, History of Civilization A.
Quarter 2	ED 4004, Integrated Language Skills, B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A *or* SOC 4010, Principles of Sociology 1; and MTH 4020, Functions and Algebra.*
Quarter 3	ED 4005, Integrated Language Skills Seminar; ENG 1111, College Writing 2; HST 4111, History of Civilization B; MTH 4030, Applications of Algebra*; and SOC 4011, Principles of Sociology 2; *or* an elective.

Business Track

Quarter 1	ED 4003, Integrated Language Skills, A; ENG 4013, Fundamentals of English 1; HST 4110, History of Civilization A *or* ECN 4601, Economics 1; and MTH 4010, Mathematical Preliminaries 2.*

*In each curriculum, students will be placed in a mathematics course based on testing results.

	Quarter 2	ED 4004, Integrated Language Skills, B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A *or* MGT 1115, Introduction to Business; and MTH 4020, Functions and Algebra.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; ECN 4601, Economics 1; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 4040, College Mathematics for Business*; and ENG 1111, College Writing 2.
Health Sciences Track	Quarter 1	ED 4003, Integrated Language Skills, A; CHM 1110, General Chemistry Preliminaries; ENG 4013, Fundamentals of English 1; and MTH 4010, Mathematical Preliminaries 2.*
	Quarter 2	ED 4004, Integrated Language Skills, B; CHM 1111, General Chemistry 1; ENG 4014, Fundamentals of English 2; and MTH 4020, Functions and Algebra.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; BIO 1142, Basic Animal Biology 1; ENG 1111, College Writing 2; MTH 4030, Applications of Algebra*; and SOC 4010, Principles of Sociology 1.

*In each curriculum, students will be placed in a mathematics course based on testing results.

Course Descriptions

Arts and Sciences

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 33.

African-American Studies

AFR 1100 Introduction to African-American Studies **4 QH**
Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1121/ENG 1678 Early African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

AFR 1131/HST 1525 African-American History 1 **4 QH**
Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. (Core Category III)

AFR 1132/HST 1526 African-American History 2 **4 QH**
Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. *Prereq. AFR 1131 or permission of instructor.*

AFR 1133 History of Blacks in the Media and the Press **4 QH**
Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Educational Issues and Minority Communities 1 **4 QH**
Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1151/ART 1218 African-American Art History **4 QH**
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America. (Core Category II)

AFR 1153/MUS 1104 Survey of African-American Music **4**
Studies the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties, bebo the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included.

AFR 1155 Foundations of Black Culture **4**
Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples. (Core Category V)

AFR 1156/MUS 1181 Music of Africa **4**
Provides a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style wil all be discussed in light of possible contributions to contemporary African-American music.

AFR 1161/ECN 1170 Economic Issues in Minority Communities **4**
Examines minority life-styles, perspectives, self-images, and social position in the urban community, particularly in terms of the application of basic economic theories to the economic rea ties of minority communities. (Core Category VI)

AFR 1171 Contemporary Black Politics **4**
Analyzes the evolution of black political thought in America and examines the socio-political contests that have served as catalysts to modern black political movements.

AFR 1191/HST 1620 Early African Civilization **4**
Studies the ancient empires of Africa, especially Ghana, Songha Mali, Zimbabwe, the city states of East Africa, Nubia, Egypt, Ethiopia, and the Congo Kingdom.

AFR 1193 Africa Today **4**
Studies the complex political and social picture of Africa. This course examines some of the salient features of black art, politi and identity in Africa.

AFR 1195 Identity and Nationalism in Africa **4**
Studies how centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry betwe factions have affected the present identities and nationalist mo ments in Africa. This course explores problems peculiar to Afri and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean **4**
Offers a descriptive and interpretive analysis of the growth of th modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine tha period in the context of colonialism and slavery in the Americas Important racial, social, political, economic, and religious issue will be addressed.

AFR 1197/HST 1621 Modern African Civilization **4 QH**
Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. (Core Category IV)

AFR 1200/ART 1216 Survey of African Art **4 QH**
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critiques, discussions, fieldwork, and hands-on interaction with art objects.

AFR 1211 African-Americans in Science, Technology, and Medicine **4 QH**
Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1220 The Black Novel **4 QH**
Focuses on the black novelist's place in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1223/MUS 1265 Jazz Improvisation 1 **4 QH**
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

AFR 1231/LIN 1231 African-American English **4 QH**
Addresses topics in the study of African-American English or Ebonics. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in schools.

AFR 1234/MUS 1234 Jazz Ensemble **1 QH**
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American musics. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

AFR 1235 Black History of Boston **4 QH**
Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society **4 QH**
Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience. (Core Category VI)

AFR 1241 The Black Family **4 QH**
Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America **4 QH**
Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1249 Black Community and Social Change **4 QH**
Explores the dynamic changes experienced by black communities in the United States since the Civil Rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social change in addressing the current search for policies and programs for community development.

AFR 1251 Survey of Black Theater and Drama **4 QH**
Focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance. Same as THE 1118.

AFR 1271/POL 1308 The Politics of Poverty **4 QH**
Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

AFR 1280/PSY 1280 Black Psychological Identity **4 QH**
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction and autobiographical narratives, as well as empirical research in the field of psychology.

AFR 1294 Third World Politics **4 QH**
Offers a comparative regional analysis of the political systems of Third World nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1295 Politics of South Africa **4 QH**
Examines contemporary political developments in South Africa. Focuses on the historical development of the system of racism called apartheid and the liberation movements, and the struggle for a democratic South Africa. Explores the role of the United Nations, the Organization of African Unity, the United States, and other international organizations and countries.

AFR 1297/HST 1605 Caribbean History **4 QH**
Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918–1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study **4 QH each**
Offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1342/POL 1342 Government and Politics of Africa **4 QH**
Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. (Core Category VI)

AFR 1350 Research Seminar **4 QH**
Provides students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Advanced Seminar **4 QH**
Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. The senior thesis is required of all African-American Studies majors. *Satisfies experiential education requirement. Prereq. Permission of instructor.*

AFR 1380 Junior/Senior Honors Program **4 QH**
For details contact the honors office.

AFR 1401 History of East Africa **4 QH**
Deals with the precolonial period and the problems of the partition of Africa in the first section of the course. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403/HST 1623 History of West Africa **4 QH**
Studies the history of West Africa and its struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa.

AFR 1405/HST 1625 History of South Africa **4 QH**
Studies pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. (Core Category VI) *Prereq. AFR 1491 or permission of instructor.*

AFR 1415/LIN 1415 African Language **4 QH**
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

AFR 1421 African-American Literature 2 **4 QH**
Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq. AFR 1127 or permission of instructor.*

AFR 1451/MUS 1112 Jazz **4 QH**
Examines the evolution of the creative improvisational musical styles commonly called jazz, from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

AFR 1470 Black Political Thought **4 QH**
Examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1575/PSY 1575 Community Psychology Laboratory **4 QH**
Students reflect upon real-world obstacles in conducting independent field research in communities in and around Northeastern during the quarter. Student reflections are used to guide research design, to evaluate theory, and to problem-solve social problems. Research topics may focus on battered women, HIV, student stress, perceptions of the media, church involvement in dealing with stress, or topics affecting large minority populations. Evaluates student performance through class discussions and written research reports.

AFR 1628/HST 1628 The African Diaspora **4 QH**
Explores the creation and transformation of the African Diaspora—connections among communities of African descent in Africa, the Americas, Europe, and Asia. Focuses on the years from 1500 to the present, and emphasizes connections among the themes of migration, identity, and popular culture.

AFR 1810, 1811,1812,1813 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

AFR 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy

PHL 1140 Social and Political Philosophy

PHL 1243 Existentialism

PHL 1335 Moral Philosophy

POL 1303 Political Behavior

POL 1362 Civil Liberties

POL 1386 International Law

SOA 1345 People in Cities

SOC 1147 Urban Social Problems

SOC 1170 Race and Ethnic Relations

SOC 1310 Class, Power, and Social Change

American Sign Language–English Interpreting

ASL 1101 American Sign Language 1 **4 QH**
Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, non-manual aspects of ASL, introductory fingerspelling, and some cultural features of the Deaf community.

ASL 1102 American Sign Language 2 **4 QH**
Continues basic language and culture study. Offers an opportunity to build receptive and expressive ASL vocabulary. Topics include the use of signing space; and further use of non-manual components, including facial expression and body postures. *Prereq. ASL 1101, or permission of instructor.*

ASL 1201 Intermediate American Sign Language 1 **4 QH**
Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the Deaf community. *Prereq. ASL 1102, or permission of instructor.*

ASL 1202 Intermediate American Sign Language 2 **4 QH**
Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq. ASL 1201, or permission of instructor.*

ASL 1211 Deaf Culture **4 QH**
Focuses on the status of Deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the Deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the Deaf community. *Prereq. ASL 1201, or permission of instructor.*

ASL 1212 Deaf History **4 QH**
Surveys the history of Deaf people in the Western world, with emphasis on the American Deaf community, their language, education, and relationship to hearing society. *Prereq. ASL 1101, or permission of instructor.*

ASL 1220 Deaf People in Society **4 QH**
Focuses on Deaf Communities as linguistic and cultural minorities. Topics include: perspectives on Deaf Communities, attitudes toward Deaf people and Sign Languages, technology and communication, the contributions of Deaf people to society, professional and social organizations of and for Deaf people, Deaf clubs as a locus of Deaf culture, communication issues, perspectives on legislation affecting the Deaf Community, legislative and political concerns of the Deaf community, and the impact of educational options for Deaf children. (Core Category IV)

ASL 1250/LIN 1250 Linguistics of American Sign Language **4 QH**
Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq. ENG 1118, and the ability to follow lectures in ASL.*

ASL 1301 Advanced American Sign Language Proficiency **4 QH**
Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in Deaf culture, society, and current affairs. *Prereq. ASL 1202, or permission of instructor.*

ASL 1302 Advanced American Sign Language Proficiency 2 **4 QH**
Continues ASL 1301. *Prereq. ASL 1301 or permission of instructor.*

ASL 1401 American Sign Language Literature **4 QH**
Examines and discusses various genres of American Sign Language. This course will concentrate on the work of current, recognized narrators in both literary and face-to-face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, Hotchkiss, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq. ASL 1202 or permission of instructor.*

ASL 1500 Introduction to Interpreting **4 QH**
Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq. or concurrent: ASL 1211 and ASL 1301. Majors only or permission of instructor.*

ASL 1505 ASL–English Interpreting 1 **4 QH**
Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq. ASL 1302 with a grade of B or better and ASL 1500. Majors only or permission of instructor.*

ASL 1506 ASL–English Interpreting 2 **4 QH**
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq. ASL 1505 with a grade of B or better. Majors only or permission of instructor.*

ASL 1507 ASL–English Interpreting 3 **4 QH**
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq. ASL 1506 with a grade of B or better. Majors only or permission of instructor.*

ASL 1520 Interpreter Role and Ethics **4 QH**
Explores ethical standards and dilemmas in ASL–English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq. ASL 1500. Majors only or permission of instructor.*

ASL 1521 Contrastive Analysis **4 QH**
Examines and contrasts the major linguistic features of ASL and English. The standard division of morphology, phonology, syntax, semantics, and register is reintroduced, and the various elements of both languages that fall under these divisions are compared point by point. *Permission of instructor.*

ASL 1522 Discourse Analysis for Interpreters **4 QH**
Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq. ASL 1250 and ASL 1302 or permission of instructor.*

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805 Directed Study **4 QH each**
Offers students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

ASL 1810 Special Topics in Interpreting **4 QH**
Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Populations settings will rotate and may include elderly, children, and foreign Deaf adults, as well as deaf-blind, multihandicapped, visual-gestural, educational, high-tech, and performing arts settings. *Prereq. ASL 1506. Majors only or permission of instructor. May be taken twice for credit.*

ASL 1820, 1821 Interpreting Practicum 1 and 2 **4 QH each**
Features practical interpreting experience in agencies serving Deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. This course fulfills the college's experiential education requirement for ASL majors. *Prereq. ASL 1507 and ASL 1520, both with a grade of B or better. Majors only or permission of instructor. May be taken twice for credit.*

ASL 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Anthropology

SOA 1100 Peoples and Cultures **4 QH**
Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1104/IAF 1104 Cultures of the World **4 QH**
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (Core Category II)

SOA 1125 Introduction to Archaeology **4 QH**
Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the forming communities of the Southwestern United States and Mississippi River area.

SOA 1133 The Americas from an Indigenous Perspective **4 QH**
Examines the history and culture of the Americas (North America, Mexico, Central America, South America, and the Caribbean) from the perspectives of its original inhabitants. Provide students with the understanding that history involves looking at not only the histories that we were never told, but also the ways in which the histories of the indigenous Americans were distorted and stereotyped. Examines the ways in which indigenous Americans are reclaiming their histories and culture in a variety of arenas and how the ways indigenous peoples have been encoded into history both influences how they are described in popular culture and textbooks and sets the tone for current issues such as territorial autonomy, political representation, control of native resources, and human rights that are fundamental in their communities. Developed through a collaborative process with indigenous students at Northeastern and elsewhere.

SOA 1146 Rural Workers in the Third World **4 QH**
Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (Core Category IV)

SOA 1155 Individual and Culture **4 QH**
Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family **4 QH**
Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression **4 QH**
Evaluates, by using anthropological investigations, the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness **4 QH**
Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1301 Human Origins **4 QH**
Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (Core Category II)

SOA 1303 Sexuality and Culture **4 QH**
Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures **4 QH**
Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary Third World and postcolonial societies; examines local responses to those changes.

SOA 1425 Cultural Survival **4 QH**
Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development **4 QH**
Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (Core Category IV)

SOA 1431 Native North Americans **4 QH**
Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth **4 QH**
Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) **4 QH**
Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study **4 QH each**
Offers independent work on a chosen topic under the direction of members of the department. *Prereq. Senior standing and department approval.*

SOA 1820, SOA 1821, SOA 1822, SOA 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

SOA 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

SOA 3100 Theory **4 QH**
Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 **4 QH**
Introduces the history of painting, sculpture, architecture, and related arts through a study of masterpieces of Western art from prehistoric times to the end of the Middle Ages. Provides an opportunity for students to become familiar with specific works, styles, and terminology of art before 1400, and to develop an ability to communicate about the visual arts.

ART 1101 History of Art Since 1400 **4 QH**
Introduces the history of painting, sculpture, architecture, and related arts through a study of masterpieces of Western art from the end of the Middle Ages to the present. Offers students the opportunity to become familiar with specific works, styles, and terminology of art. Emphasizes communication about the visual arts.

ART 1106 Introduction to Art **4 QH**
Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (Core Category II)

ART 1111 Introduction to World Architecture 1 **4 QH**
Introduces selected examples of world architecture and urbanism. Emphasizes historic development of architecture, building types, stylistic characteristics, and relations between architectural works and the cultures that produce them. (Prehistoric to c. 1300)

Art 1112 Introduction to World Architecture 2 **4QH**
Introduces selected examples of world architecture and urbanism. Emphasizes historic development of architecture, building types, stylistic characteristics, and the relations between architectural works and the cultures that produce them. (c. 1300 to c. 1950)

ART 1124 Basic Drawing **4 QH**
Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.

ART 1127 Basic Painting **4 QH**
Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.

ART 1130 Visual Studies Foundation 1 **4 QH**
Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2 **4 QH**
Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms.

ART 1132 Principles of Graphics **4 QH**
Explores conceptual principles underlying the professional practice of design, including visual problem-solving processes, terminology, and methodology. Offers students the opportunity to learn to determine problem objectives, work to specifications, and investigate creative alternatives through lectures and critiques tied to assigned problems for which students are expected to present professionally crafted solutions. *Prereq. ART 1130 or permission of instructor.*

ART 1133 Graphic Design 1 **4 QH**
Applies graphic design principles to the correlation of forms with their function, content, and context. Explores a variety of media, including letterform photographic image-making and manipulation, and 3-D forms as elements of visual solutions. Exposes students to many forms of visual expression, including artists' books and moving images. *Prereq. ART 1132, ART 1134, and ART 1160.*

ART 1134 Typography 1 **4 QH**
Introduces letterforms in visual communication. Studies typography as form and explores visual principles affecting organization and access of typographic information. Introduces use of the typographic grid and issues of hierarchy and legibility through assigned projects, readings, and lectures. Includes exploration of the history, character, and potential application of a variety of typefaces. Lab fee. *Prereq. ART 1130 or permission of instructor.*

ART 1144 Typography 2 **4 QH**
Builds on the studies in ART 1134, shifting the focus from letterform to text type in a series of projects and exercises. Assignments increase in typographic complexity, bringing into play issues of structure, hierarchy, legibility, and readability in a variety of applications and media. Lab fee. *Prereq. ART 1134.*

ART 1150 Architectural Design 1 **4 QH**
Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of seminal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq. ART 1156 or GE 1103.*

ART 1151 Architectural Design 2 **4 QH**
Introduces the idea of architectural language. Projects include analysis of a specific building by an important modern architect, the design of a single space within an existing structure, and a new building designed to coordinate with the original modern building. The studio focuses on composition, structure, materials, drawing, and craft. *Prereq. ART 1150.*

ART 1156 Architectural Drafting **4 QH**
Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axonometric, one- and two-point perspective drawings. *Prereq. ART 1124.*

ART 1160 Introduction to Photography **4 QH**
Explores the basics of black and white photography. Introduces the 35mm camera, manual exposure control, negative processing, and black and white printing in the department's state-of-the-art lab. *No previous photography experience required.* Lab fee.

ART 1170 Filmmaking Workshop **4 QH**
Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.

ART 1171 Animation Basics **4 QH**
Offers an introductory studio course that explores the creative potential of animation. Exposes students to animation processes and techniques through lectures, demonstrations, and hands-on assignments. Provides a historical survey of animation art through the twentieth century. Emphasizes using the computer to creatively develop concepts while learning the fundamental skills of constructing animated images and forms. Lab fee. *Prereq. ART 1130.*

ART 1175 Animation Studio 1 **4 QH**
Provides intensive introduction to 3-D computer modeling and scene layout. Offers substantial hands-on explorations. Allows students to gain comprehensive skills for formal construction of organic and geometric models. Emphasizes creative development of virtual landscapes, structures, and characters. Cinematic principles provide the foundation for final composition of animated scenes. Lab fee. *Prereq. ART 1171.*

ART 1180 Video Basics **4 QH**
Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.

ART 1185 Still Digital Imaging **4 QH**
Provides the introductory still digital imaging course in the multimedia studies program. Demonstrates and uses scanning, Adobe Photoshop, and outputting. Lab fee. *Prereq. ART 1160 or permission of instructor.*

ART 1190 Introduction to Computer Graphics **4 QH**
Extends the study of visual problem-solving by introducing the computer as a tool for design and image-making. Weekly classes and labs in the Electronic Studios allow investigation into the medium's potential, limitations, and relationship to other media. Issues of sequencing, transformation, and motion through time and space are emphasized, with examination of their relevance to a broad spectrum of applications and disciplines. Lab fee. *Prereq. ART 1130 and ART 1131 or permission of instructor.*

ART 1195 Intermediate Digital Photography **4 QH**
Provides the second level digital photography courses in the multimedia studies program. Offers higher levels of course and lab work involving scanning, Adobe Photoshop, and outputting. Requires a final project for successful completion of the course. Lab fee. *Prereq. ART 1185.*

ART 1204 Renaissance Architecture **4 QH**
Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.

ART 1205 Renaissance Art **4 QH**
Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time. (Core Category III)

ART 1210 Nineteenth Century Painting **4 QH**
Explores art from 1780 to 1900. Considers developments such as neo-classicism, romanticism, realism, impressionism, and symbolism in terms of major changes in society: the city of Paris, industrialization, Transcendentalism, photography, Japonisme, the portrayal of women, and the Salons. Emphasizes French painting, but important developments in other European countries and America are considered. Museum visits included. (Core Category III)

ART 1213 Modern Art **4 QH**
Examines the ideas and artists from the 1880s through the 1980s. Focuses on major developments in twentieth century European and American painting, but also surveys sculpture, design, and related arts. Presents a thematic approach, exploring abstraction, expressionism, surrealism, utopian ideas of pure form, modernism, and post-modernism. Museum visits included.

ART 1216/AFR 1200 Survey of African Art **4 QH**
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critique, discussions, fieldwork, and hands-on interaction with art objects.

ART 1218/AFR 1151 African-American Art History **4 QH**
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

ART 1220 American Art **4 QH**
Offers a broad survey of the history of American painting and sculpture from the seventeenth century to the present. Explores the social and cultural forces as well as the aesthetic and intellectual concerns that shape the evolution of art in America. Includes frequent visits to the Museum of Fine Arts and the Gardner Museum. (Core Category III)

ART 1223 American Architecture **4 QH**
Offers an introduction to the history, theory, and criticism of American architecture and urban planning from the mid-1600s to the 1930s. Explores the social and cultural forces that shape the built environment. Examines European influences as well as uniquely American contributions. Emphasizes the work of Louis Sullivan, H. H. Richardson, and Frank Lloyd Wright. (Core Category III)

ART 1225 Modern Architecture: The Nineteenth Century **4 QH**
Surveys the development of modern architecture in the United States and Europe from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design in the context of their cultural responses to society's changing conditions. Includes field trips. *A previous course in art or architectural history is recommended.*

ART 1226 Modern Architecture: The Twentieth Century **4 QH**
Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism and deconstruction. Includes field trips. *A previous course in art or architectural history is recommended.*

ART 1229 American House Architecture **4 QH**
Examines the architecture of American houses from first settlements of European colonists in the sixteenth century to issues in the 1900s. Aims to uncover the ways that architecture, seen through the lens of a particular building type, responds to the demands of materials, climate and geography, ethnic traditions, artistic expression, and changing societal forms.

ART 1230 History of Photography **4 QH**
Explores photography from its origins in 1839 to its maturity after World War II. Examines technological advances, the documentary aesthetic, art photography, and theoretical approaches to the study of the medium. Photographs are studied as art objects, personal statements, and historical artifacts. Museum visits included.

ART 1233 Contemporary Directions in Photography **4 QH**
Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.

ART 1235 History of Film **4 QH**
Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

ART 1236 American Film **4 QH**
Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.

ART 1237 Contemporary Directions in Cinema **4 QH**
Provides a comparative study of major international film movements from World War II to the present. Studies selected films by representative contemporary directors. Includes lectures, screenings, and discussions.

ART 1240 History of Graphic Design **4 QH**
Considers the history, context, and issues of graphic design through lectures, readings, discussions, and projects. *Prereq. ART 1101.*

ART 1243 Graphic Design 2 **4 QH**
Investigates the range of conceptual possibilities inherent in the merging of words/text with images/symbols through the understanding of how their relationship can enhance meaning and comprehension. Explores visual poetry, choices in mark and form, and applied semiotics through projects, readings, and lecture/discussion. Lab fee. *Prereq. ART 1133 and ART 1250.*

ART 1244 Graphic Design 3 **4 QH**
Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. Lab fee. *Prereq. ART 1190 and ART 1243. Junior or senior art majors only.*

ART 1250 Color Theory and Practice **4 QH**
Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.

ART 1252 Architectural Design 3 **4 QH**
Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq. ART 1151.*

ART 1253 Architectural Design 4 **4 QH**
Introduces the study of urban design. Students learn to analyze the structures and ordering systems of both historical and contemporary cities. Projects include urban analysis (frequently focusing on the Boston area) and proposed solutions. This studio addresses the problems associated with designing at several different scales at one time. *Prereq. ART 1252.*

ART 1254 Intermediate Drawing **4 QH**
Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq. ART 1124 or equiv.*

ART 1256 Theory of Structures 1 **4 QH**
Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq. PHY 1222.*

ART 1257 Theory of Structures 2 **4 QH**
Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber frame, space frame, and shell systems. *Prereq. ART 1256 and PHY 1222.*

ART 1261 Intermediate Black and White Photography **4 QH**
Emphasizes combining personal aesthetic choices with work to refine photographic skills. A second-level black and white photography studio/lab course. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq. ART 1160 or permission of instructor. Junior or senior art majors only.*

ART 1263 Introduction to Color Photography **4 QH**
Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in photography and contemporary color photographic processes. Working with color negative films, students get hands-on experience with the RA-4 color print process. Assignments emphasize solving technical and aesthetic problems inherent in color negative materials and include weekly lab sessions. Color chemistry and facilities are provided. Lab fee. *Prereq. ART 1160.*

ART 1264 Color Photography 2 **4 QH**
Allows students to explore and develop their personal photographic style with an emphasis on experimentation. A second-level color course. Studies historical perspective of color photography contrasted with contemporary color work. Offers students the opportunity to develop the necessary foundation for critical analysis of their own work through required reading. Includes weekly assignments and critiques. Students will develop a cohesive portfolio of photographs. Lab fee. *Prereq. ART 1261 and ART 1263.*

ART 1280 Media Graphics **4 QH**
An intermediate computer-based course in creating moving images. Time-based sequencing and characteristics of motion and transformation are explored in a series of digital projects and lab workshops. Projects increase in length and complexity, and may have a basis in instructional or information design, entertainment, or artistic exploration. Analogies between digital moving image and other time-based arts are explored through assignments, lectures, demonstrations, and visits to professional studies. Introduces interactivity and multiple media. Lab fee. *Prereq. ART 1133, ART 1180, and ART 1190.*

ART 1281 Video Project **4 QH**
Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq. ART 1180 or equivalent.*

ART 1285 Interarts **4 QH**
Introduces nontraditional art concepts in an intensive studio course. Includes categories of performance art, installation art, electronic art, multimedia and kinetic art. Using their own frames of reference and experience, students contribute to a collaborative project and are responsible for keeping a journal that will help them formulate their ideas. Students reflect upon their co-ops, internships, and other art-related experiences in a written essay that will accompany their final product. *Arts and Sciences experiential education requirement.*

ART 1290 Electronic Publishing Design **4 QH**
Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. Lab fee. *Prereq. ART 1133, ART 1134, and ART 1190. Junior and senior art majors only.*

ART 1291 Computer Graphics Workshop **4 QH**
Builds on the visual and technical experience of ART 1190 in a sequence of applied projects integrating word and image. Emphasizes imaginative and effective use of digital input and output devices, in conjunction with conventional media, to develop unexpected visual language. Portions of weekly classes are conducted as collaborative workshops and supported by labs, with students encouraged to interact with each other to enhance technical, problem-solving, and effective critiquing skills. Lab fee. *Prereq. ART 1144, ART 1190, and ART 1243. Senior art majors only.*

ART 1295 Computer-Aided Design **4 QH**
Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications. Lab fee. *Prereq. ART 1190 or equivalent.*

ART 1296 Advanced Studio in Computer Visualization **4 QH**
Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis. Lab fee. *Prereq. ART 1295.*

ART 1310 Seminar in Modern Architecture **4 QH**
Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism, post-modernism, and deconstruction. Focuses on the work and ideas of such architects as Le Corbusier, Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Peter Eisenman, Frank Gehry, and Rem Koolhaas. *Prereq. ART 1226 or permission of instructor.*

ART 1324 Thesis in Art History **4 QH**
Focuses on the production of a 20–30 page thesis. Students undertake individual research, under the direction of a faculty member, on art-historical topics appropriate to their personal and professional interests. Conceived for art majors who are completing the BA degree and whose primary interest is in art history. *Arts and Sciences experiential education requirement for general art/art history. Prereq. ART 1100, ART 1101, 20 QH in other art history courses, departmental permission.*

ART 1330 Advanced Visual Communication **4 QH**
Presents an advanced seminar whose development sequence mirrors that of complex professional design projects. Extends a single applied project in phases through an entire term. Central to the course will be a substantive written problem definition and program development integrating academic and applied design experience. Lab fee. *Arts and Sciences experiential education requirement for graphic design. Prereq. ART 1144, ART 1244, and ART 1280. Senior art majors only.*

ART 1341 Architectural Design 5 **6 QH**
Introduces the issues of "tectonics," or the logic and order of assembling a building's parts. Looks at the different characteristics of materials and how they can be combined to achieve different effects. Students work on a single project throughout the term, focusing first on the specific connections of building parts and moving later to the general order of the project. *Prereq. ART 1253.*

ART 1342 Architectural Design 6 **6 QH**
Requires students to integrate previously acquired knowledge in the resolution of a specific building program for a specific site. Provides students with the opportunity to investigate the relationship between the different aspects of design and how it leads to the resolution of architectural forms. Incorporates the issues of context, tectonics, and typology into the design of a single building. *Prereq. ART 1341.*

ART 1352 Architectural Thesis 1 **6 QH**
One of two final studio courses. Provides an opportunity for students to investigate different sites around Boston, and to synthesize knowledge from previous design studios, history and technical courses, as well as various co-op work experiences. Students are expected to develop design strategies through drawings, models, and writings toward the creation of a well-developed architectural project. *Arts and Sciences experiential education requirement for architecture. Prereq. ART 1150–1151, ART 1252–1253, ART 1341, and ART 1342.*

ART 1353 Architectural Thesis 2 **6 QH**
The second part of the capstone course in studio architecture, following upon Architectural Thesis 1. Provides an opportunity for students to research a site and define the terms of their design solution. Students are expected to develop a complete architectural proposal in writing, drawing, and model form. *Prereq. ART 1352.*

ART 1354 Portfolio Review **1 QH**
Requires students to prepare and submit a portfolio of work completed in their required studio foundation courses and the first studios of their concentration areas. Offered as a pass/fail course and acts as a filter for more advanced courses and is a prerequisite for all upper-level studio courses. *Prereq. 36 QH in ART courses including ART 1124, ART 1130, ART 1131, and specific courses according to concentration.*

ART 1355 Environmental Systems **4 QH**
Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq. ART 1252 or permission of instructor.*

ART 1363 Advanced Photography Seminar **4 QH**
Requires that students refine their technical skills, master the 4 × 5 inch view camera (supplied), and make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. The capstone course to the Photography Program, this course stresses individual direction and a qualitative approach to substantive photography. Lab fee. *Arts and Sciences experiential education requirement. Prereq. Permission of instructor. Senior art majors only.*

ART 1713 Modern Art (Honors) **4 QH**
Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq. Honors status or permission of instructor.*

ART 1800, ART 1801, ART 1802 Directed Study **4 QH each**
Offers independent work under the direction of members of the department on a chosen topic. *Prereq. Junior and senior art major or department approval.*

ART 1803, ART 1804, ART 1805 Directed Study **6 QH each**
Offers independent work under the direction of members of the department on a chosen topic. *Prereq. Junior and senior art major or department approval.*

ART 1810, ART 1811, ART 1812, ART 1813 **4 QH each**
Junior/Senior Honors Program
For details, contact the honors office.

ART 1814 Directed Study **1 QH**
Offers independent work under the direction of members of the department on a chosen topic.

ART 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

ART 1899 Advanced Television Production **4 QH**
Provides students the opportunity to produce a half-hour television show for air on Cable Vision of Boston. Students are responsible for creating, shooting, and editing the show, as well as assembling necessary cast and crew. Students should have a fundamental knowledge of both videotape shooting and editing.

ART 1900, 1901, 1902 Directed Study **4 QH each**
Offers independent work under the direction of members of the department on a chosen topic in graphic design or photography. Lab fee.

Biology

Courses are presented in three categories: non-science majors; health-related science and other non-biology science majors; and biology majors. Two or more courses with substantially the same content may not be counted toward quantitative graduation requirements. If a student is not sure whether particular courses overlap it is his/her responsibility to get advice from a departmental adviser.

The following courses are primarily for non-science majors. These courses are not open to biology majors.

BIO 1111 Environment and Man **4 QH**
Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. (Core Category II)

BIO 1171 Focus on the Sea: Issues and Nature **2 QH**
Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1174 Introduction to Marine Biology **3 QH**
Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. Taken concurrently with BIO 1675 lab.

BIO 1182 The Human Organism **4 QH**
Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Taken concurrently with BIO 1683 lab.

BIO 1187 Biology of Human Reproduction **4 QH**
Studies the sexual and reproductive function in the human male and female, including sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually-transmitted disease. Analyzes factors affecting reproduction and sexuality in various human populations.

BIO 1675 Introduction to Marine Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1174. Lab fee.

BIO 1683 Human Organism Lab **1 QH**
Laboratory taken concurrently with BIO 1182. Lab fee.

The following courses are primarily for majors in science- or health-related professions. These courses, where indicated, are not open to biology majors.

BIO 1108 General Biology **4 QH**
Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. Taken concurrently with BIO 1608 lab. (Overlaps BIO 1100 and BIO 1142).

BIO 1109 Animal Biology **4 QH**
Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Taken concurrently with BIO 1609 lab. (Overlaps BIO 1101 and BIO 1143.) *Prereq. BIO 1108 and BIO 1608.*

BIO 1122 Basic Microbiology **4 QH**
Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Taken concurrently with BIO 1622 lab. (Overlaps BIO 1323.) *Prereq. BIO 1142 and BIO 1642, or permission of instructor; not open to biology majors.*

BIO 1142 Basic Animal Biology 1 **4 QH**
Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. Taken concurrently with BIO 1642 lab. (Overlaps BIO 1100 and BIO 1108.)

BIO 1143 Basic Animal Biology 2 **4 QH**
Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Taken concurrently with BIO 1643 lab. (Overlaps BIO 1101 and BIO 1109.) *Prereq. BIO 1142 and BIO 1642.*

BIO 1160 Functional Human Anatomy and Physiology 1 **4 QH**
Covers cell and tissue structure and function, anatomical terminology, and the anatomy and physiology of bones, muscles, and the nervous system. Taken concurrently with BIO 1650 lab. (Overlaps BIO 1162.) *Not open to biology majors.*

BIO 1161 Functional Human Anatomy and Physiology 2 **4 QH**
Covers anatomy and physiology of the respiratory, digestive, urogenital, endocrine, and cardiovascular systems, and a brief exploration of the anatomy and physiology of the eye and ear. Taken concurrently with BIO 1651 lab. (Overlaps BIO 1163 and BIO 1164.) *Prereq. BIO 1160 and BIO 1650; not open to biology majors.*

BIO 1162 Integrated Human Anatomy and Physiology 1 **4 QH**
Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of skin, bones, muscles, and blood. Taken concurrently with BIO 1652 lab. (Overlaps BIO 1160.) *Not open to biology majors.*

BIO 1163 Integrated Human Anatomy and Physiology 2 **4 QH**
Presents the structure and function of the following systems: nervous, endocrine, and reproductive. Taken concurrently with BIO 1653 lab. (Overlaps BIO 1161.) *Prereq. BIO 1162 and BIO 1652; not open to biology majors.*

BIO 1164 Integrated Human Anatomy and Physiology 3 **4 QH**
Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Taken concurrently with BIO 1654 lab. (Overlaps BIO 1161.) *Prereq. BIO 1163 and BIO 1653; not open to biology majors.*

BIO 1608 General Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1108. Lab fee.

BIO 1609 Animal Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1109. Lab fee.

BIO 1622 Basic Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1122. Lab fee.

BIO 1642 Basic Animal Biology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1142. Lab fee.

BIO 1643 Basic Animal Biology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1143. Lab fee.

BIO 1650 Functional Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1160. Lab fee.

BIO 1651 Functional Human Anatomy and Physiology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1161. Lab includes studies of sensory physiology, enzymes, metabolism, and cardiovascular, respiratory, and urinary function. Lab fee.

BIO 1652 Integrated Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1162. Lab includes pig dissection. Lab fee.

BIO 1653 Integrated Human Anatomy and Physiology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1163. Lab includes pig dissection. Lab fee.

BIO 1654 Integrated Human Anatomy and Physiology 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1164. Lab includes pig dissection. Lab fee.

BIO 1660 Functional Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1160. Lab includes the study of human bones and muscles, pig dissection, and muscle and nerve physiology. Lab fee.

The following courses are primarily for biology majors but are open to other students with appropriate prerequisites and permission of the instructor.

BIO 1100 Principles of Biology 1 **4 QH**
Introduces basic biological principles. Topics include: the first human retrovirus; the nature of scientific thought and knowledge; launching the antibiotic era; diabetes and the discovery of insulin; the cellular pathway of insulin secretion; DNA science; the principles of inheritance, and others. Integrates topics into discussions of disease and pathological processes and how fundamental biological principles form the foundation of medical science. Taken concurrently with BIO 1600 lab.

BIO 1101 Principles of Biology 2 **4 QH**
Introduces the diversity of animals through presentation of their systematic relationships, structure and function, and ecological roles. Cellular, tissue, and organismal levels are included. Taken concurrently with BIO 1601 lab. *Prereq. BIO 1100 and BIO 1600.*

BIO 1102 Principles of Biology 3 **4 QH**
Examines the biology and diversity of plants and plant-like organisms. Explores the relationships between humans and plants by looking at plants through three different perspectives: 1) Feeding a Starving World; 2) Curing a Sick World; and 3) Engineering a Better World. Employs case studies to highlight major themes. Taken concurrently with BIO 1602 lab. *Prereq. BIO 1100 and BIO 1600 or BIO 1108 and BIO 1608.*

BIO 1222 Environmental and Population Biology **4 QH**
Considers physical and chemical factors of the environment as they affect the distribution of organisms and as they may in turn be affected by the organisms. Includes population dynamics, species interactions, population genetics (lightly), the development of communities, and the structure and function of ecosystems. Taken concurrently with BIO 1611 lab. *Prereq. BIO 1102, BIO 1602, and BIO 1108, BIO 1608, and BIO 1109, BIO 1609 or BIO 1100–1102, BIO 1600–1602, and CHM 1111.*

BIO 1270 Diving Research Methods **4 QH**
Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, underwater measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq. Scuba certification.*

BIO 1282 Genetics **4 QH**
Focuses on classical and molecular approaches to understanding heredity. Topics include Mendelian genetics, linkage, recombination, gene mapping, chromosomal genetics, molecular genetics, recombinant DNA methods, gene regulation, and developmental genetics. Taken concurrently with BIO 1660 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602 and BIO 1108–1109, BIO 1608–1609, and CHM 1264.*

BIO 1283 Introductory Biochemistry **4 QH**
Topics include structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways. Taken concurrently with BIO 1661 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602, and BIO 1108–1109, BIO 1608–1609, BIO 1282 and BIO 1660, CHM 1221, and CHM 1265.*

BIO 1317 Marine Ecology **4 QH**
Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. East/West program, Friday Harbor. Taken concurrently with BIO 1613 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1321 Evolution **4 QH**
Discusses history of evolutionary theory and lines of evidence. Emphasis is placed on mechanisms of speciation. Introduces current evolutionary topics. Taken concurrently with BIO 1621 lab. *Prereq. BIO 1222, BIO 1611, and BIO 1282, BIO 1660.*

BIO 1323 General Microbiology **4 QH**
Introduces morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1122.) Taken concurrently with BIO 1623 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602, and BIO 1108–1109, BIO 1608–1609; CHM 1111, and CHM 1122.*

BIO 1333 Marine Botany **4 QH**
Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Taken concurrently with BIO 1630 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1334 Molecular Marine Botany **4 QH**
Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Taken concurrently with BIO 1644 lab. *Prereq. BIO 1333 and BIO 1630.*

BIO 1343 Vertebrate Zoology **4 QH**
Presents systematics, behavior, ecology, and zoogeography of all classes of vertebrates. Taken concurrently with BIO 1641 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, and BIO 1609, or BIO 1222 and BIO 1611.*

BIO 1344 Biology of Crustacea **4 QH**
Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. Taken concurrently with BIO 1645 lab. *Prereq. BIO 1373 or GEO 1428 or permission of instructor.*

BIO 1346 Embryology **4 QH**
Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Lab work emphasizes the frog, chick, and pig. Taken concurrently with BIO 1646 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609 and BIO 1282, BIO 1660.*

BIO 1349 Animal Histology **4 QH**
Offers microscopic study of fundamental types of animal tissues. Taken concurrently with BIO 1648 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609.*

BIO 1355 Regulatory Cell Physiology **4 QH**
Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical messengers and regulators, and principles of cellular contraction and motility. Taken concurrently with BIO 1655 lab. *Prereq. BIO 1101 and BIO 1601 or BIO 1109 and BIO 1609.*

BIO 1356 Comparative Vertebrate Anatomy **4 QH**
Examines the morphology and phylogeny of the vertebrates. Taken concurrently with BIO 1656 lab. *Prereq. BIO 1101 and BIO 1601, or BIO 1109 and BIO 1609 or BIO 1222 and BIO 1611.*

BIO 1373 Marine Invertebrate Zoology **4 QH**
Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Taken concurrently with BIO 1673 lab. *Prereq. BIO 1101 and BIO 1601 or BIO 1109 and BIO 1609.*

BIO 1387 The Biology of Corals **4 QH**
Concentrates on tropical crudaria; studies the systematics, anatomy, physiology, and ecology of this group of animals that assume such an important role in tropical marine ecosystems. East/West Program, Jamaica. Taken concurrently with BIO 1687 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1403 Histologic Technique **4 QH**
Discusses general methods of tissue preparation for purposes of microscopic study. Taken concurrently with BIO 1603 lab. *Prereq. BIO 1102 and BIO 1602.*

BIO 1413 Tropical Terrestrial Ecosystems **3 QH**
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq. BIO 1222 and BIO 1611.*

BIO 1414 Benthic Marine Ecology **4 QH**
Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Taken concurrently with BIO 1612 lab. *Prereq. BIO 1222 and BIO 1611; BIO 1373 and BIO 1673.*

BIO 1416 Microbial Physiology **4 QH**
Focuses on prokaryotic diversity, including differing types of metabolic activity, evolution, systematics, and taxonomy. Discusses the *Archaea* and eukaryotic microorganisms. Taken concurrently with BIO 1616 lab. *Prereq. BIO 1323 and BIO 1623 or equivalent.*

BIO 1418 Marine Microbial Ecology **4 QH**
Examines the diversity of marine microorganisms and recent advances in the area of microbial ecology. Emphasizes the structure and function of microbial food webs in marine communities. Taken concurrently with BIO 1615 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1419 Plant Physiology **4 QH**
Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral metabolism and nutrition, photosynthesis, hormones, growth, and development are included. Taken concurrently with BIO 1629 lab. *Prereq. BIO 1102, BIO 1602, and CHM 1265.*

BIO 1426 Medical Microbiology **4 QH**
Emphasizes host-parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Taken concurrently with BIO 1626 lab. *Prereq. BIO 1323 and BIO 1623 or equivalent.*

BIO 1433 Lower Plants **4 QH**
Examines the morphology, ultrastructure, ecology, life cycles, and reproductive strategies of nonvascular plants. Taken concurrently with BIO 1633 lab. *Prereq. BIO 1102 and BIO 1602, BIO 1222 and BIO 1611.*

BIO 1434 Higher Plants **4 QH**
Studies the origin and evolution of land plants since their invasion of the land surface in late Silurian and early Devonian times, approximately 405 to 370 million years ago; compares early and modern land plants and discusses their evolution; examines the flower as a reproductive structure. Taken concurrently with BIO 1634 lab. *Prereq. BIO 1102 and BIO 1602, BIO 1222 and BIO 1611.*

BIO 1435 Plant Development **4 QH**
Examines the structural and molecular aspects of plant development beginning with the fertilization apparatus of higher plants and the development of the embryonic plant. Studies the structure and development of the vegetative and reproductive organs of the plant. Applies the advances in the fields of cellular and molecular biology to the interpretation of plant development. Students progress from learning fundamental information on each topic through reading contemporary research papers. Student projects will be the focus of the laboratory. Taken concurrently with BIO 1635 lab. *Prereq. BIO 1102 and BIO 1602, BIO 1222 and BIO 1611.*

BIO 1442 Vertebrate Paleontology **4 QH**
Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1222, BIO 1611 and BIO 1282, BIO 1660; or permission of instructor.*

BIO 1450 Immunology **4 QH**
Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq. BIO 1283 or BIO 1461. May be taken concurrently with BIO 1467.*

BIO 1452 Comparative Neurobiology **4 QH**
Presents a cellular approach to structure and function of the nervous system. Topics include neuronal anatomy, cellular properties of single neurons, synaptic transmission, integration in nerve cells, nerve networks, sensory systems, motor systems, sensory-motor integration, specification of neuronal connectivity, and phylogeny of nervous systems. *Prereq. General (animal) physiology.*

BIO 1455 Advanced Invertebrate Zoology **4 QH**
Concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Taken concurrently with BIO 1662 lab. *Prereq. BIO 1373 and BIO 1673.*

BIO 1456 Parasitology **4 QH**
Examines the symbiotic relationships of parasitic protozoans, flatworms, nematodes, and arthropods. Taken concurrently with BIO 1663 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609 and BIO 1282, BIO 1660.*

BIO 1458 Wildlife Biology **4 QH**
Presents concepts and techniques utilized in the conservation and study of wild vertebrates in lecture, laboratory, and weekly field trips. Subjects include habitat management, endangered species, exotic species, zoonoses, financing, and legislation. Taken concurrently with BIO 1658 lab. *Prereq. BIO 1222, BIO 1611 and BIO 1343, BIO 1643.*

BIO 1459 Ornithology **4 QH**
Discusses anatomy, physiology, behavior, ecology, and systematics of birds. Taken concurrently with BIO 1659 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609 and BIO 1222, BIO 1611.*

BIO 1460 Current Concepts in Cell Biology **4 QH**
Examines selected topics in cellular structure and function of eukaryotes, for example, compartmentalization and its underlying physical and biochemical processes. Topics will vary. Lab fee. *Prereq. BIO 1282 and BIO 1660.*

BIO 1461 General Biochemistry **4 QH**
Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, nucleotides, and amino acids. *Prereq. BIO 1282, BIO 1660, and organic chemistry. May be taken concurrently with BIO 1462.*

BIO 1462 General Biochemistry Laboratory **4 QH**
Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two lab periods and one lecture per week. Lab fee. *Prereq. BIO 1283, BIO 1661, or concurrent with BIO 1461.*

BIO 1463 Cellular Biochemistry **4 QH**
Emphasizes the structure and function of organelles, mechanisms of signal transduction, and regulation of gene expression. *Prereq. BIO 1283 and BIO 1661.*

BIO 1464 Marine Birds and Mammals **4 QH**
Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. Taken concurrently with BIO 1669 lab. *Prereq. BIO 1222, BIO 1611 and BIO 1343, BIO 1643.*

BIO 1467 Molecular Biology **4 QH**
Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes experimental design and proof in macromolecular chemistry and genetics. *Prereq. BIO 1283, BIO 1661, or BIO 1461. May be taken concurrently with BIO 1450.*

BIO 1468 Mammalogy **4 QH**
Discusses anatomy, physiology, behavior, ecology, and systematics of mammals. Taken concurrently with BIO 1668 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1222, BIO 1611.*

BIO 1473 Systems Physiology **4 QH**
Covers function and regulation of major physiological systems in animals including energy metabolism, thermoregulation, muscle and movement, circulation, respiration, salt and water balance, and circadian rhythms. Emphasizes vertebrates but material on invertebrates will be included where appropriate. Taken concurrently with BIO 1677 lab. *Prereq. BIO 1283, BIO 1661 or BIO 1355, BIO 1655, or permission of instructor.*

BIO 1474 Neuroethology **4 QH**
Concentrates on the mechanisms underlying behavior of model invertebrates and lower invertebrates in a lecture, field, and lab course. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Taken concurrently with BIO 1674 lab. *Prereq. BIO 1283 and BIO 1661.*

BIO 1476 Herpetology **4 QH**
Emphasizes the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Mandatory field trips. Taken concurrently with BIO 1676 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1282, BIO 1660.*

BIO 1480 Senior Biochemistry Seminar **1 QH**
Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq. BIO 1283 and BIO 1661.*

BIO 1481 Ocean and Coastal Processes 1 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. The first of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Friday Harbor. Taken concurrently with BIO 1680 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1482 Ocean and Coastal Processes 2 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. The second of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Jamaica. Taken concurrently with BIO 1681 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1483 Ocean and Coastal Processes 3 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles through comparative studies. The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Offered at Marine Science Center in Nahant. Taken concurrently with BIO 1682 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1485 Biology and Ecology of Fish **4 QH**
Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Taken concurrently with BIO 1685 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1486 Environmental Microbiology **4 QH**
Studies the microbial environment and ecology of the cell. Explores interactions between microbial populations, stressing soil and fresh water associations. Taken concurrently with BIO 1686 lab. *Prereq. BIO 1323 and BIO 1623.*

BIO 1489 Adaptations of Aquatic Organisms **4 QH**
Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. Taken concurrently with BIO 1689 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1490 Senior Seminar **1 QH**
Examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Emphasizes student presentation and analysis. Limited to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq. BIO 1283 and BIO 1661.*

BIO 1491, BIO 1492 Directed Study 1, 2 **2 QH each**
Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq. BIO 1283 and BIO 1661.*

BIO 1494 Experiential Education Capstone in Biology **4 QH**
Integrates student experiential activities with academic coursework, in the framework of a scientific poster presentation or equivalent. Requires extensive written summary of and reflection upon experiences and coursework, library research of scientific questions related to the experiences, and preparation of oral and poster presentations of this research. All phases will be accompanied by classroom discussion and critique. *Prereq. 80 QH and at least one experiential activity.*

BIO 1495, BIO 1496, BIO 1497, BIO 1498 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

BIO 1600 Principles of Biology 1 Lab **1 QH**
Laboratory involves demonstrations and hands-on practice of the concepts discussed in lecture. Laboratory taken concurrently with BIO 1100. Lab fee.

BIO 1601 Principles of Biology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1101. Lab fee.

BIO 1602 Principles of Biology 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1102. Lab fee.

BIO 1603 Histological Technique Lab **1 QH**
Laboratory taken concurrently with BIO 1403. Lab fee.

BIO 1611 Environmental and Population Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1222. Lab fee.

BIO 1612 Benthic Marine Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1414. Lab fee.

BIO 1613 Marine Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1317. Lab fee.

BIO 1615 Marine Microbial Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1418. Lab fee.

BIO 1616 Microbial Physiology Lab **1 QH**
Laboratory taken concurrently with BIO 1416. Lab fee.

BIO 1621 Evolution Lab **1 QH**
Laboratory taken concurrently with BIO 1321. Laboratory involves students in library research.

BIO 1623 General Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1323. Lab fee.

BIO 1626 Medical Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1426. Lab fee.

BIO 1629 Plant Physiology Lab **1 QH**
Laboratory taken concurrently with BIO 1419. Lab fee.

BIO 1630 Marine Botany Lab **1 QH**
Laboratory taken concurrently with BIO 1333. Lab fee.

BIO 1633 Lower Plants Lab **1 QH**
Laboratory taken concurrently with BIO 1433. Lab fee.

BIO 1634 Higher Plants Lab **1 QH**
Laboratory taken concurrently with BIO 1434. Lab fee.

BIO 1635 Plant Development Lab **1 QH**
Laboratory taken concurrently with BIO 1435. Student projects will be the focus of the laboratory. Lab fee.

BIO 1641 Vertebrate Zoology Lab **1 QH**
Laboratory taken concurrently with BIO 1343. Laboratories consist of study of vertebrate specimens and field trips to observe species in their habitats. Lab fee.

BIO 1644 Molecular Marine Botany Lab **1 QH**
Laboratory taken concurrently with BIO 1334. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee.

BIO 1645 Biology of Crustacea Lab **1 QH**
Laboratory taken concurrently with BIO 1344. Lab fee.

BIO 1646 Embryology Lab **1 QH**
Laboratory taken concurrently with BIO 1346. Lab work emphasizes the frog, chick, and pig. Lab fee.

BIO 1648 Animal Histology Lab **1 QH**
Laboratory taken concurrently with BIO 1349. Lab fee.

BIO 1655 Regulatory Cell Physiology Lab **1 QH**
Laboratory taken concurrently with BIO 1355. Lab fee.

BIO 1656 Comparative Vertebrate Anatomy Lab **1 QH**
Laboratory taken concurrently with BIO 1356. Lab work consists of the dissection of the shark, mud puppy, and cat. Lab fee.

BIO 1658 Wildlife Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1458. Lab fee.

BIO 1659 Ornithology Lab **1 QH**
Laboratory taken concurrently with BIO 1459. Lab fee.

BIO 1660 Genetics Lab **1 QH**
Laboratory taken concurrently with BIO 1282. Laboratory includes work with *Drosophila*, fungi, bacteria, and DNA plasmids. Lab fee.

BIO 1661 Introductory Biochemistry Lab **1 QH**
Laboratory taken concurrently with BIO 1283. Lab fee.

BIO 1662 Advanced Invertebrate Zoology Lab **1 QH**
Laboratory taken concurrently with BIO 1455. Lab fee.

BIO 1663 Parasitology Lab **1 QH**
Laboratory taken concurrently with BIO 1456. Lab fee.

BIO 1668 Mammalogy Lab **1 QH**
Laboratory taken concurrently with BIO 1468. Laboratories involve study of specimens, field collection, and museum preparation, including a weekend field trip. Lab fee.

BIO 1669 Marine Birds and Mammals Lab **1 QH**
Laboratory taken concurrently with BIO 1464. Labs include identifying, dissecting, and preparing specimens that occur along the New England coast. Lab fee.

BIO 1673 Marine Invertebrate Zoology Lab **1 QH**
Laboratory taken concurrently with BIO 1373. Lab emphasizes living marine forms, with dissection of representative organisms. Lab fee.

BIO 1674 Neuroethology Lab **1 QH**
Laboratory taken concurrently with BIO 1474. Lab fee.

BIO 1677 Systems Physiology Lab **1 QH**
Laboratory taken concurrently with BIO 1473. Lab fee.

BIO 1680 Ocean and Coastal Processes 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1481. Lab fee.

BIO 1681 Ocean and Coastal Processes 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1482. Lab fee.

BIO 1682 Ocean and Coastal Processes 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1483. Lab fee.

BIO 1685 Biology and Ecology of Fish Lab **1 QH**
Laboratory taken concurrently with BIO 1485. Lab fee.

BIO 1686 Environmental Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1486. Lab fee.

BIO 1687 Biology of Corals Lab **1 QH**
Laboratory taken concurrently with BIO 1387. Lab fee.

BIO 1689 Adaptations of Aquatic Organisms Lab **1 QH**
Laboratory taken concurrently with BIO 1489. Lab fee.

BIO 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Chemistry

Introductory Chemistry Courses

CHM 1105 General Chemistry for the Health Sciences 1 **5 QH**
Examines topics in inorganic chemistry relevant to students in the health sciences. Topics include atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases; equilibrium; and kinetics. Topics are related to molecular processes in the human body. Lab fee.

CHM 1106 General Chemistry for the Health Sciences 2 **5 QH**
Introduces organic chemistry and organic substances of biological significance. Covers structure and reactivity of alkanes, alkenes, alkynes, aromatic compounds, oxygen-containing compounds (alcohols, aldehydes, ketones, esters, ethers, and carboxylic acids), sulfur-containing compounds (thiols and sulfides), nitrogen-containing compounds (amines and amides), carbohydrates, proteins, lipids, and nucleic acids. Biological chemistry includes the study of enzymes, vitamins, metabolic pathways, and body fluids. Lab fee. *Prereq. CHM 1105.*

CHM 1107 Basic Chemistry for the Nursing Professional **5 QH**
A survey course beginning with descriptions of atoms and molecules and ending with an understanding of the relationships between the structures and functions of drugs, metabolites, proteins, polysaccharides, nucleic acids, and other important biomolecules. Emphasizes throughout the visualization of chemical compounds and molecules as a means of describing their properties. Lab fee.

CHM 1111 General Chemistry for the Life Sciences 1 **5 QH**
Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (Core Category II)

CHM 1122 General Chemistry for the Life Sciences 2B **5 QH**
For nonchemistry majors who will be taking CHM 1264. Covers chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq. CHM 1111.*

CHM 1130 Fundamentals of Chemistry **4 QH**
Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students 1 **4 QH**
Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2 **4 QH**
Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical transformations. *Prereq. CHM 1131.*

CHM 1138 General Chemistry Laboratory **1 QH**
Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1 **5 QH**
For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2 **5 QH**
Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq. CHM 1111 or CHM 1151.*

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry **4 QH**
For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq. CHM 1122 or equivalent.*

CHM 1231 Analytical Chemistry for Majors **5 QH**
For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq. CHM 1152 or equivalent.*

CHM 1264 Organic Chemistry for Biology Science Majors 1 **5 QH**
For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq. CHM 1122, CHM 1152, or equivalent.*

CHM 1265 Organic Chemistry for Biology Science Majors 2 **5 QH**
Continues CHM 1264. Lab fee. *Prereq. CHM 1264.*

CHM 1268 Organic Chemistry for Pharmacy Majors 1 **5 QH**
For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq. CHM 1122, CHM 1152, or equivalent.*

CHM 1269 Organic Chemistry for Pharmacy Majors 2 **5 QH**
Continues CHM 1268. Lab fee. *Prereq. CHM 1268.*

CHM 1271 Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 **3 QH**
For chemistry and biochemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq. CHM 1153 or CHM 1132, and CHM 1138 or equivalent.*

CHM 1272 Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 2 **5 QH**
Continues CHM 1271. Lab fee. *Prereq. CHM 1271.*

CHM 1274 Organic Chemistry 3: The Organic Chemistry of Living Process 5 QH
Examines advanced functional group chemistry, especially as relevant to molecules of nature. Studies polycarbonyl compounds, phenols, carbohydrates, lipids, terpenoids and steroids, amino acids and peptides, alkaloids, nucleic acids, and antibiotics and hormones. Lab fee. *Prereq. CHM 1272 or equivalent.*

CHM 1381 Physical Chemistry 1 3 QH
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq. CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equivalent; PHY 1223, PHY 1233, or equivalent.*

CHM 1382 Physical Chemistry 2 3 QH
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq. CHM 1381.*

CHM 1383 Physical Chemistry 3 3 QH
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq. CHM 1382.*

CHM 1394 Experimental Physical Chemistry 1 2 QH
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq. CHM 1381 or taken concurrently.*

CHM 1395 Experimental Physical Chemistry 2 2 QH
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq. CHM 1382 or taken concurrently.*

CHM 1396 Experimental Physical Chemistry 3 2 QH
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq. CHM 1383 or taken concurrently.*

CHM 1422 Instrumental Methods of Analysis 4 QH
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in non-optical spectroscopy. *Prereq. CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.*

CHM 1432 Instrumental Analysis Laboratory 2 QH
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.

CHM 1441 Inorganic Chemistry 4 QH
Studies atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq. CHM 1383.*

CHM 1461 Identification of Organic Compounds 3 QH
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq. CHM 1265 or CHM 1273.*

CHM 1491, CHM 1492 Directed Study 2 QH each
Offers independent work under the direction of a faculty member. *Prereq. An organic chemistry sequence,* and *analytical chemistry and departmental approval.*

CHM 1521 Advanced Analytical Chemistry 1 3 QH
Examines analytical separations. Corresponds to CHM 3511. *Prereq. CHM 1422 or equivalent.*

CHM 1523 Advanced Analytical Chemistry 2 3 QH
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3514. *Prereq. CHM 1422 or equivalent.*

CHM 1525 Advanced Analytical Chemistry 3 3 QH
Covers optical methods of analysis. Corresponds to CHM 3513. *Prereq. CHM 1422 or equivalent.*

CHM 1561 Advanced Organic Chemistry 1 3 QH
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3566. *Prereq. CHM 1273 or CHM 1265.*

CHM 1562 Advanced Organic Chemistry 2 3 QH
Examines organic structure and reactions. Corresponds to graduate course CHM 3666. *Prereq. CHM 1561.*

CHM 1563 Advanced Organic Chemistry 3 3 QH
Focuses on organic structure and properties. Corresponds to graduate course CHM 3567. *Prereq. CHM 1562.*

CHM 1564 Spectrophotometric Identification of Organic Compounds 3 QH
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3569. *Prereq. CHM 1273 or equivalent.*

CHM 1581 Advanced Physical Chemistry 1 3 QH
Examines chemical thermodynamics. Corresponds to graduate course CHM 3586. *Prereq. CHM 1383.*

CHM 1591 Advanced Physical Chemistry 2 3 QH
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3596. *Prereq. CHM 1383.*

CHM 1738 General Chemistry Laboratory (Honors) 1 QH
Honors equivalent of CHM 1138. Lab fee.

CHM 1741 General Chemistry 1 (Honors) 4 QH
Honors equivalent of CHM 1131.

CHM 1742 General Chemistry 2 (Honors) **4 QH**
Honors equivalent of CHM 1132.

CHM 1751 General Chemistry 1 (Honors) **5 QH**
Honors equivalent of CHM 1151. Lab fee.

CHM 1752 General Chemistry 2 (Honors) **5 QH**
Honors equivalent of CHM 1152. Lab fee.

CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research **4 QH each**
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. *Prereq. Middler standing or above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.*

CHM 1811 Advanced Chemical Laboratory Practice 1 **4 QH**
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. *Prereq. CHM 1273, CHM 1395, CHM 1396, CHM 1422, and departmental approval.*

CHM 1812 Advanced Chemical Laboratory Practice 2 **4 QH**
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. *Prereq. CHM 1811 and departmental approval.*

CHM 1840, CHM 1841, CHM 1842, CHM 1843 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

CHM 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Communication Studies

CMN 1110 Voice and Articulation **4 QH**
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

CMN 1111 Oral Interpretation of Literature **4 QH**
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.

CMN 1115 Foundations of Communications **4 QH**
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.

CMN 1116 Public Speaking **4 QH**
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.

CMN 1210 Advanced Voice and Articulation **4 QH**
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. *Prereq. CMN 1110.*

CMN 1211 Advanced Oral Interpretation **4 QH**
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. *Prereq. CMN 1111.*

CMN 1232 Communication and Gender **4 QH**
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such as "genderlect," gender bias in language, and gender images communicated in the media.

CMN 1239 Argumentation and Debate **4 QH**
Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. *Prereq. CMN 1116 or permission of instructor.*

CMN 1240 Advanced Studies in Speech Performance **4 QH**
Provides an opportunity to expand skills and strategies in public speaking and debate. Designed for students in the forensic program and for students wishing more in-depth study of public speaking and debate. Emphasizes development of competitively successful approaches to public speaking. *Prereq. CMN 1116 or CMN 1239 or permission of instructor.*

CMN 1250 Introduction to Mass Communication **4 QH**
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.

CMN 1300 Communication Theory **4 QH**
Surveys significant theories of human communication. Emphasizes such topics as systems theory, symbolic interaction theory, structuralist theories, and critical-cultural studies.

CMN 1310 The Classical Age of Speech and Rhetoric **4 QH**
Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.

CMN 1315 Theories of Persuasion **4 QH**
Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.

CMN 1317 The Audience in Mass Communication **4 QH**
Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fanship, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq. CMN 1250.*

CMN 1318 Negotiation Skills **4 QH**
Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq. Middler standing or above or permission of instructor.*

CMN 1330 Interpersonal Communication **4 QH**
Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.

CMN 1331 Advanced Interpersonal Communication **4 QH**
Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq. CMN 1330.*

CMN 1338 Group Discussion **4 QH**
Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.

CMN 1410 Contemporary Public Address **4 QH**
Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.

CMN 1415 Persuasion in Contemporary Culture **4 QH**
Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq. CMN 1315 or permission of instructor.*

CMN 1430 Organizational Communication **4 QH**
Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization.

CMN 1431 Advanced Organizational Communication **4 QH**
Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations. *Prereq. CMN 1430.*

CMN 1437 Consultation Skills **4 QH**
Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. *Prereq. CMN 1115.*

CMN 1450 Television Studio Production **4 QH**
Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. *Prereq. CMN 1250 or permission of instructor.*

CMN 1451 Foundations of Broadcast Technology **4 QH**
Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.

CMN 1452 Radio Production **4 QH**
Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. *Prereq. CMN 1250 or permission of instructor.*

CMN 1453 Broadcast Management **4 QH**
Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. *Prereq. CMN 1250 and middler standing or above.*

CMN 1454 Programming for Radio and Television **4 QH**
Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television. *Prereq. CMN 1250.*

CMN 1455 Television Field Production **4 QH**
Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. *Prereq. CMN 1250 and CMN 1450.*

CMN 1500 Special Topics in Communication Studies **4 QH**
Examines various contemporary issues in communication studies. Course content to be posted in communication studies department prior to quarter in which it is offered. *Please consult department prior to registering.*

CMN 1554 Special Topics in Media **4 QH**
Examines various contemporary issues in mass media.

CMN 1555 Communication and the Quality of Life **4 QH**
Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. *Prereq. Middler standing, CMN 1330, or permission of instructor.*

CMN 1600 Introduction to Communication Research **4 QH**
Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research.

CMN 1610 Rhetorical Criticism **4 QH**
Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (Core Category V)

CMN 1620 Television Criticism **4 QH**
Offers an advanced communication course where students analyze and evaluate representations of race, class, gender, and the family in television discourse. Aims to increase awareness of the ways that the aural, visual, and aesthetic codes of television work to shape beliefs and values.

CMN 1650 Senior Seminar in Communications **4 QH**
Provides an in-depth review of the student's mastery of the curriculum. Includes a battery of assessment measures to allow students to demonstrate skills competencies in communication. Expects students to complete a research project designed to integrate the student's experiential education with the principles and skills learned in the classroom. *Prereq. Permission of instructor, majors only, and middler-year standing.*

CMN 1800, CMN 1801, CMN 1802, CMN 1803 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

CMN 1890, CMN 1891, CMN 1892 Directed Study **4 QH each**
Prereq. Permission of instructor.

CMN 1893 Directed Study **1 QH**
Prereq. Permission of instructor.

CMN 1894 Directed Study **2 QH**
Prereq. Permission of instructor.

CMN 1895 Internship in Speech Communication **4 QH**
Gives students the opportunity to gain hands-on experience in the communications industry. Requires prior approval by the internship director prior to registration. Further internship details are available in the department office.

CMN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

CMN 1899 Advanced Television Production
Provides students with guidance in the development of special projects in television and video production. Studies include advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and post-production technology. Students involved in the Northeastern Student Network project may also receive credit. *Prereq. Permission of instructor.*

Economics

Courses ECN 1000–1199 are Pathway courses, for which there are no prerequisites. Courses ECN 1200–1299 are required courses with specified prerequisites. Courses ECN 1300–1499 are upper-level elective courses with specified prerequisites; exceptions to these may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives **4 QH**
Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. *Not recommended for students who have completed either ECN 1115 or ECN 1116.* (Core Category II) (Pathway)

ECN 1115 Principles of Macroeconomics **4 QH**
Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (Core Category II) (Pathway)

ECN 1116 Principles of Microeconomics **4 QH**
Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (Core Category II) (Pathway)

ECN 1130 Health Care and Medical Economics **4 QH**
Examines health-care trends in the United States; medical care expenditures; the impact of medical care on health, morbidity, and mortality; CPI and MCPI; the role of gatekeepers; markets for medical care, health insurance, physicians, and nurses; DRGs, HMOs, CONs; the politics of health care; national health insurance; extended-care facilities; life care plans; consumer responsibilities; "Date to be 100"; and health-care quality. (Pathway)

ECN 1140 Economics of Crime **4 QH**
Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies. (Core Category VI) (Pathway)

ECN 1150 Economics of World Energy and Primary Resources **4 QH**
Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. (Pathway)

ECN 1170 Economic Issues in Minority Communities **4 QH**
Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (Core Category VI) (Pathway)

ECN 1171 Women in the Labor Market **4 QH**
Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. (Pathway)

ECN 1180 Industrial Organization and Public Policy **4 QH**
Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).* (Pathway)

ECN 1181 Economics of Art and Culture **4 QH**
Presents an overview of the economic aspects of art and culture. Examines the production and consumption of art and culture and the role of the public and private sectors. Topics include: consumer demand, economic models of nonprofit cultural organization, competition and market structure in the arts, artists as members of the labor force, productivity issues in the performing arts, public support for the arts, and the role and impact of public and private subsidies. (Pathway)

ECN 1190/IAF 1190 The Global Economy **4 QH**
Introduces the history, structure, and growth of the international economy. Considers dimensions of global economic interdependence, including population, foreign investment, and environmental spillovers. Analyzes a few key economic issues of current importance for major regions of the world, such as economic integration in Western Europe or the emergence of the East Asian dragons.

ECN 1191/IAF 1330 Development Economics **4 QH**
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (Core Category V) (Pathway)

ECN 1192 American Economic Development **4 QH**
Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes. (Pathway)

ECN 1193 Economic History of Less Developed Countries **4 QH**
Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250); ECN 1330 recommended.*

ECN 1215 Macroeconomic Theory **4 QH**
Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment, and growth in the light of recent economic history. *Prereq. ECN 1115 or two Pathway courses, and MTH 1114 or equivalent.*

ECN 1216 Microeconomic Theory **4 QH**
Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq. ECN 1116 or two Pathway courses, and MTH 1114 or equivalent.*

ECN 1220 History of Economic Thought **4 QH**
Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1250 Statistics **4 QH**
Discusses basic probability, descriptive statistics, estimation techniques, statistical hypotheses, sampling, analysis or variance, correlation, and regression analysis in the context of economics. Computer applications are an integral part of this course. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*

ECN 1251 Statistics 2 **4 QH**
Studies analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq. ECN 1250. Economics majors who have earned credit for ECN 1251 may not receive credit for MSC 1201.*

ECN 1260 Problems in Economic Research **4 QH**
Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1310 Labor Economics **4 QH**
Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq. ECN 1116 or ECN 1115 or any three economics courses (excluding ECN 1250).*

ECN 1311 Employment and Training Programs and Policies **4 QH**
Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq. ECN 1115 or any three economics courses (excluding ECN 1250).*

ECN 1314 Economics of Education and Human Capital **4 QH**
Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1315 Income Inequalities and Discrimination **4 QH**
Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq. ECN 1115 or ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1320 Urban Economics **4 QH**
Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use patterns. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1321 Urban Economic Problems and Policies **4 QH**
Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1322 Economics of Transportation **4 QH**
Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1323 Environmental Economics **4 QH**
Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1333 European Economic Development **4 QH**
Discusses economic inheritance of the nineteenth century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed areas in southern Europe; environmental impact of industrialism and the implications of technological society. (Core Category III) (Pathway)

ECN 1334 Comparative Economics **4 QH**
Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1335 International Economics: Finance **4 QH**
Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements, and the international monetary system. *Prereq. ECN 1115 or any three economics courses (excluding ECN 1250) or permission of instructor.*

ECN 1336 International Economics: Trade **4 QH**
Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250) or permission of instructor.*

ECN 1340 Government Expenditures: Structure and Evaluation **4 QH**
Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq. ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1341 Financing of Government: Taxation and Debt **4 QH**
Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq. ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1342 Money and Banking **4 QH**
Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq. ECN 1115 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1345 Business Cycles and Inflation **4 QH**
Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1215.*

ECN 1350 Introduction to Econometrics **4 QH**
Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1353 Introduction to Mathematics for Economists **4 QH**
Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1360 Managerial Economics **4 QH**
Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1361 Social Control of Economic Activities **4 QH**
Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1401 Advanced Economic Theory **4 QH**
Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq. ECN 1215 and ECN 1216.*

ECN 1415 Selected Topics in Macroeconomics **4 QH**
Studies macroeconomic issues. *Prereq. Permission of instructor.*

ECN 1416 Selected Topics in Microeconomics **4 QH**
Studies microeconomic issues. *Prereq. Permission of instructor.*

ECN 1481 Directed Study **1 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1482 Directed Study **2 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1483 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1484 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1492 Senior Economics Seminar **4 QH**
Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq. ECN 1216 and ECN 1215; senior economics majors only.*

ECN 1495, ECN 1496, ECN 1497, ECN 1498 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

ECN 1715 Macroeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1116.

ECN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Education

ED 1003 Reading/Study Skills 1 **4 QH**
Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2 **4 QH**
Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills **4 QH**
Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-tos of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Human Services and Social Science **4 QH**
Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Introduction to Education **4 QH**
Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Child Development, Learning and Education **4 QH**
Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Adolescent Development, Learning, and Education **4 QH**
Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Learning and the Teaching Process **4 QH**
Explores learning and teaching within different types of schools. Examines the pedagogical, environmental, and historical factors that affect the instructional processes and influence educational outcomes.

ED 1106 Creative Expression in Children **4 QH**
Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq. ED 1102.*

ED 1107 Beginning Computer Use in Education **4 QH**
Introduces students who are unfamiliar with software applications to computer use through general purpose software: word processing and data processing. Covers operating systems commands as well as concepts relating to computer hardware and software. Suggests methods of applying the computer to study requirements in college and to teaching.

ED 1302/HS 1101 The Human Services Professions **4 QH**
Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq. ED 1100, SOC 1100, or equivalent.*

ED 1309/HS 1219 Intervention Strategies for the Human Services **4 QH**
Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment **4 QH**
Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq. PSY 1111 or SOC 1100.*

ED 1318 Seminar in Early Childhood Development **4 QH**
Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq. ED 1102.*

ED 1319 Speech, Language, and Cognition in the Young Child **4 QH**
Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq. ED 1102.*

ED 1405 Teaching Children's Literature and the Arts **4 QH**
Offers a comprehensive survey of the field of children's literature and literature for young adults. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial children's books and, contemporary illustrators. Provides students with the opportunity to learn how to integrate language arts, visual arts, and music in the teaching of literature.

ED 1407 Elementary Education Curriculum 2 **4 QH**
Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq. ED 1406.*

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1 **4 QH**
Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq. ED 1104.*

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2 **4 QH**
Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq. ED 1410.*

ED 1412 Fundamentals of Curriculum Development **4 QH**
Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1417 Student Teaching Practicum and Seminar **8 QH**
A 150-clock-hour student practicum and related biweekly seminar. Allows for full-time participation in a University-arranged and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Arts and Sciences experiential education requirement. Prereq. Completion of advanced sequence in early childhood education with minimum of 2.5 QPA.*

ED 1420 Student Teaching Practicum for the Pre-K Setting **4 QH**
A 150-clock-hour student teaching practicum and related biweekly seminar. Offers extensive participation with supervision in a pre-K program. Students analyze learning and teaching and demonstrate, evaluate, and develop teaching skills while working with young children with diverse backgrounds and needs. *Arts and Sciences experiential education requirement. Prereq. Completion of advanced professional sequence in early childhood education with minimum 2.5 QPA.*

ED 1421 Curriculum for the Pre-K Years **4 QH**
Presents theories of active learning and learning through play as applied in the pre-kindergarten years. Offers students the opportunity to learn to specify goals in order to: facilitate children's growth, development, and achievement of skills in communication, inquiry, creative expression, and interpersonal relations; plan, implement, and evaluate content and methodology in various curriculum areas; incorporate developmentally appropriate, integrated learning experiences; select materials and create learning environments; and integrate children with special needs. *Prereq. ED 1102 and ED 1104.*

ED 1423 Multicultural Education **4 QH**
Reviews aspects of the history and culture of different ethnic groups to explore the manner in which certain themes and issues are manifested. Examines and evaluates ethnic and multicultural school curricula in relation to specific educational criteria and goals and their potential impact on learners. Requires students to select and organize historical, literary, and artifact materials from specific ethnic groups and to use them in the planning of learning experiences for classroom use.

ED 1425 Elementary School Mathematics and Science **4 QH**
Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education majors. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Teaching the Language Arts **4 QH**
Emphasizes literacy development in the elementary grades. Presents an integrated language learning perspective drawn from recent research on language and literacy acquisition to serve as the basis for instructional methodology. Students are expected to build an understanding both of how children develop in language, reading, and writing and of language structure that will enable them to make appropriate instructional decisions in the classroom.

ED 1470 Freshman Seminar **1 QH**
Continues work begun in ED 1101, Introduction to Education, in a series of seminars during the winter and spring quarters. Students prepare an educational plan and are introduced to a number of current educational issues.

ED 1480 Junior/Senior Seminar for Education Majors **1 QH**
Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and incorporates advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the teacher's union, teacher certification, graduate school, career issues for women, and alternative careers in education.

ED 1800 Directed Study 1 **4 QH**
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

ED 1801 Directed Study 2 **4 QH**
For students who have completed ED 1800.

ED 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013 and ENG 1111; ENG 1110 and ENG 1111. For the College of Engineering, ENG 1110 and ENG 1111, and for international students, ENG 1004, ENG 1005, and ENG 1006; or ENG 1005 and ENG 1006.

ENG 1004 Fundamentals of English-SOL **4 QH**
Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. Pass/fail grading. *Prereq. Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.*

ENG 1005 College Writing 1-SOL **4 QH**
Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq. ENG 1004 or special placement.*

ENG 1006 College Writing 2-SOL **4 QH**
Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq. ENG 1005 or equivalent.*

ENG 1013 Basic Writing **4 QH**
Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. Pass-fail grading. *Prereq. Special placement.*

ENG 1110 College Writing 1 **4 QH**
Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems.

ENG 1111 College Writing 2 **4 QH**
Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq. ENG 1110.*

ENG 1115 Poetry **4 QH**
Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1116 Fiction **4 QH**
Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1117 Drama **4 QH**
Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1118/LIN 1118 Introduction to Language and Linguistics **4 QH**
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (Core Category II)

ENG 1119/LIN 1119 History of the English Language **4 QH**
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1120 Survey of English Literature 1 **4 QH**
Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1121 Survey of English Literature 2 **4 QH**
Surveys the major British writers and major literary movements from the Romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1123 Survey of American Literature 1 **4 QH**
Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1124 Survey of American Literature 2 **4 QH**
Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1125 Technical Writing **4 QH**
Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals and by making oral presentations. *Prereq. ENG 1110 and ENG 1111 and 80 QH.*

ENG 1126 Backgrounds in English and American Literature **4 QH**
Examines in translation Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1218/LIN 1218 Introduction to Language and Linguistics 2 **4 QH**
A workshop that focuses on three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that underlie the linguistic system inside each language user's mind, with a slant toward "doing" linguistics: playing with data, analyzing it, and ultimately explaining it. *Prereq. ENG 1118/LIN 1118 or permission of instructor.*

ENG 1275 Grammar for Journalists **4 QH**
Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. *Prereq. Journalism majors only.*

ENG 1276 Science Fiction **4 QH**
Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1277 Topics in Science Fiction **4 QH**
Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1278 Modern Bestseller **4 QH**
Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1279 The Modern Novel **4 QH**
Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1280 Modern Drama **4 QH**
Studies the development of drama from realism to surrealism, from Ibsen to Beckett. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1281 The Modern Short Story **4 QH**
Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1283 Contemporary Fiction **4 QH**
Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, Morrison, Kingston, and Barth. Emphasizes experimental and modernist authors. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1285 Literature and the Law **4 QH**
Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1286 Literature and Politics **4 QH**
Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1287 The Literature of Science **4 QH**
Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1288 Film and Text **4 QH**
Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era *(Catch-22, The Graduate). Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1289 Shakespeare on Film **4 QH**
Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1290 Topics in Film **4 QH**
Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1293 Topics in Popular Culture **4 QH**
Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1294 Modern Film **4 QH**
Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1300 Topics in Fiction **4 QH**
Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1307 Literary Interpretation **4 QH**
Introduces students to a variety of interpretive methods by studying literary works in different genres—poetry, fiction, and drama—in conjunction with critical texts. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1309 Topics in Literary Criticism **4 QH**
Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop **1 QH**
Emphasizes the writing process: multiple drafts, revision, editing, and publication. Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. *Prereq. 80 QH and Pharmacy, Physical Therapy, or Engineering majors.*

ENG 1350 Writing for the Professions **4 QH**
Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. *Prereq. ENG 1110 and ENG 1111 and 80 QH.*

ENG 1351 Creative Writing **4 QH**
Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1352 Advanced Writing **4 QH**
Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq. ENG 1350 or permission of instructor.*

ENG 1357 Poetry Workshop **4 QH**
Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq. ENG 1351 or permission of instructor.*

ENG 1360 Writing Practicum **4 QH**
An upper-level writing course designed for transfer students who have had transfer credit accepted by Northeastern University, but whose performance on the Introductory Writing Program essay indicates that they would benefit from another course in writing. Taken for elective credit, focuses on reading and writing in an academic context. Requires students to write expository essays that allow them to rehearse a number of different writing strategies as they explore a single topic of their choice (in consultation with the instructor) for the entire term. Students are required to keep a portfolio of all their work (from notes to drafts to final essay), a reading notebook, and a grammar log.

ENG 1361 The Writing Process **4 QH**
Offers students training in the teaching of writing and reading in the professional literature of writing theory and instruction, under the guidance of the instructor. Students tutor in the Writing Center and/or other venues as part of their coursework. Ordinarily, students will spend one day a week meeting in class with the instructor, and the rest of their time working and meeting with the instructor outside the classroom. Requires a final paper reflecting on their experience as teachers of writing. *Fulfills the college's experiential education requirement for English majors.*

ENG 1362 Publication Arts **4 QH**
Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1370 Technical Writing 2 **4 QH**
Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq. ENG 1125 or permission of instructor.*

ENG 1371 Writing for the Computer Industry **4 QH**
Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq. ENG 1125 or permission of instructor and one computer science course.*

ENG 1380 Writing for the Health Professions **4 QH**
Provides an opportunity for students in the health services to develop a recommendation report that incorporates personal experience with academic critique. Students will be required to evaluate scholarly and popular journals in their fields. Includes workshop, editing, and peer review.

ENG 1381 Writing for the Professions: Business Administration **4 QH**
Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1382 Writing for the Professions: Criminal Justice **4 QH**
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1400 Topics in Genre **4 QH**
Explores the characteristics of a particular literary form over time through works by various authors. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1401/LIN 1401 Introduction to Syntax **4 QH**
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (Core Category V) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1402/LIN 1402 Grammars of English **4 QH**
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1407/LIN 1407 Introduction to Semantics **4 QH**
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture? *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1408/LIN 1408 Topics in Linguistics **4 QH**
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1409 American Novels 1 **4 QH**
Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Stowe, Melville, Twain, and James. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1410 American Novels 2 **4 QH**
Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1411 English Drama 1 **4 QH**
Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1412 English Drama 2 **4 QH**
Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1550 Psychology and Literature **4 QH**
Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Wolfe, Faulkner, Conrad, and Lawrence. Same as INT 1707.

ENG 1551 Gender Roles in Literature **4 QH**
Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1552 Fantasy **4 QH**
Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1557 Topics in Fantasy **4 QH**
Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1558, ENG 1559 Literature in Context **4 QH each**
Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the settlement of America. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1600, ENG 1601 Topics in Literature **4 QH each**
Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1602, ENG 1607 Major Figure **4 QH each**
Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1608 The City in Literature **4 QH**
Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1609 Contemporary American Literature **4 QH**
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1610 Early American Literature **4 QH**
Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1611 New England Renaissance **4 QH**
Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience. Includes such writers as Emerson and Thoreau, Hawthorne, Fuller, and Melville. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1612 American Realism **4 QH**
Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Harding, Davis, Howells, Crane, and Norris. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1617 Modern American Literature **4 QH**
Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1618 Children's Literature **4 QH**
Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland, Uncle Remus, Little Women,* and *The Wizard of Oz. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1619 Topics in Children's Literature **4 QH**
Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1621 Nineteenth-Century British Fiction **4 QH**
Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1622 Major Twentieth-Century British Novelists **4 QH**
Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1627 Medieval English Literature **4 QH**
Surveys the major works of medieval English literature. Includes works such as *Sir Gawain, Piers Plowman,* and *Pearl. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1628 Chaucer **4 QH**
Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1629 Topics in Chaucer **4 QH**
Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1630 Milton **4 QH**
Concentrates on Milton's *Paradise Lost,* with supplementary readings in his minor poetry and prose. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1631 Topics in Medieval Literature **4 QH**
Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1632 Sixteenth-Century Literature **4 QH**
Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1637 Seventeenth-Century English Literature **4 QH**
Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1639 Eighteenth-Century English Literature **4 QH**
Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1640 Topics in Eighteenth-Century Literature **4 QH**
Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1641 Romantic Poetry **4 QH**
Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (Core Category V) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1647 Victorian Literature **4 QH**
Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1648 Topics in Victorian Literature **4 QH**
Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1649 World Literature 1 **4 QH**
Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1650 World Literature 2 **4 QH**
Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1652 Twentieth-Century English Literature **4 QH**
Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1658 Introduction to Shakespeare **4 QH**
Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1659 Shakespeare's Comedies **4 QH**
Studies the romantic comedies, problem comedies, and romances, ranging from *The Merchant of Venice* to *The Tempest. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1660 Shakespeare's Tragedies **4 QH**
Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from *Julius Caesar* to *Coriolanus. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1661 Topics in Shakespeare **4 QH**
Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1662 The Bible **4 QH**
Studies books of both the Old Testament and the New Testament as literature and as history. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1667 Modern Poetry **4 QH**
Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and cummings. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1677 Contemporary Poetry **4 QH**
Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1678/AFR 1121 Early African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1679 Modern African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1690, ENG 1691 Junior/Senior Seminar **4 QH each**
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new feminism and the novel, or the canon and its revisions. Emphasizes independent research in a seminar setting. *Prereq. ENG 1110 and ENG 1111 or equivalent and junior/senior status.*

ENG 1692/LIN 1692, ENG 1693/LIN 1693
Junior/Senior Seminar in Linguistics **4 QH each**
Explores important topics in language and linguistics, such as style and meaning or language and gender. Emphasizes independent research in a seminar setting. *Prereq. ENG 1110 and ENG 1111 or equivalent and junior/senior status.*

ENG 1694 Topics in Experiential Education **4 QH**
Explores such topics as writing about place, writing about people, or reviewing and writing about culture. Combines class meetings, reading assignments, and individual meetings with the instructor, with learning experiences outside the classroom. *Fulfills the college's experiential education requirement for English majors. Prereq. ENG 1110 and ENG 1111 or equivalent and junior standing in the English major.*

ENG 1695 Internship Practicum **4 QH**
Offers students internships in such areas as publishing, education, or business and technical writing under the direction of a faculty member. Students are required to produce both a portfolio of professional work and a final paper reflecting on their internship experience. *Fulfills the college's experiential education requirement for English majors. Prereq. ENG 1110 and ENG 1111 or equivalent and junior standing in the English major.*

ENG 1710 Freshman English 1 (Honors) **4 QH**
Honors equivalent of ENG 1110.

ENG 1711 Freshman English 2 (Honors) **4 QH**
Honors equivalent of ENG 1111.

ENG 1721 Survey of English Literature 2 (Honors) **4 QH**
Honors equivalent of ENG 1121.

ENG 1723 Survey of American Literature 1 (Honors) **4 QH**
Honors equivalent of ENG 1123.

ENG 1725 Technical Writing (Honors) **4 QH**
Honors equivalent of ENG 1125.

ENG 1750 Intermediate Writing (Honors) **4 QH**
Honors equivalent of ENG 1350.

ENG 1758 Introduction to Shakespeare (Honors) **4 QH**
Honors equivalent of ENG 1658.

ENG 1781 Writing for Business (Honors) **4 QH**
Honors equivalent of ENG 1381.

ENG 1810, ENG 1811 Directed Study **4 QH each**

ENG 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Geology

GEO 1119 Marine Resources **4 QH**
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.

GEO 1120 Physical Oceanography **4 QH**
Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.

GEO 1121 Biological Oceanography **4 QH**
Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.

GEO 1122 New England Fishery Resources **4 QH**
Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.

GEO 1128 Geology of Oceans and Coasts **4 QH**
Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (Core Category II)

GEO 1140 Environmental Geology **4 QH**
Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal. (Core Category VI)

GEO 1141 Geological Hazards and Resources **4 QH**
Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (Core Category II)

GEO 1154 Planetary Astronomy **4 QH**
Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (Core Category V)

GEO 1208 Age of Dinosaurs **4 QH**
Focuses on major physical and biological events of the Mesozoic Era of Earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.

GEO 1212 Physical Geology **4 QH**
Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (Core Category II)

GEO 1213 Physical Geology Laboratory **1 QH**
Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq. GEO 1212; may be taken concurrently.*

GEO 1222 Historical Geology **4 QH**
Traces the physical and biological history of the Earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (Core Category II)

GEO 1223 Historical Geology Laboratory **1 QH**
Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq. GEO 1222; may be taken concurrently.*

GEO 1250 Advanced General Geology **4 QH**
Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq. GEO 1212 and GEO 1222.*

GEO 1308 Petrology **5 QH**
Studies the hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. *Prereq. GEO 1212.*

GEO 1310 Descriptive Mineralogy **5 QH**
Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq. Two quarters of chemistry.*

GEO 1311 Optical Crystallography **5 QH**
Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq. GEO 1310.*

GEO 1312 Petrography **5 QH**
Covers description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq. GEO 1311.*

GEO 1320 Field Geology **4 QH**
Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq. GEO 1212.*

GEO 1412 Geochemistry **4 QH**
Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq. Two quarters of chemistry.*

GEO 1414 Igneous and Metamorphic Petrology **5 QH**
Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq. GEO 1312.*

GEO 1418 Structural Geology **5 QH**
Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq. GEO 1212 and GEO 1213.*

GEO 1420 Geophysics **4 QH**
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the Earth's crust. *Prereq. GEO 1212, or instructor's permission.*

GEO 1424 Stratigraphy **5 QH**
Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq. GEO 1222.*

GEO 1428 Invertebrate Paleontology **5 QH**
Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates.

GEO 1430 Sedimentation and Sedimentary Environments **5 QH**
Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.

GEO 1432 Sedimentary Petrology **5 QH**
Covers origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq. GEO 1311.*

GEO 1435 Coastal Processes **5 QH**
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq. GEO 1212.*

GEO 1436 Marine Geology **4 QH**
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq. GEO 1212.*

GEO 1438 Geology and Land-Use Planning **4 QH**
Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq. GEO 1140, GEO 1212, or permission of instructor.*

GEO 1440 Geomorphology **5 QH**
Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq. GEO 1212.*

GEO 1441 Geographical Information Systems **4 QH**
Offers an introduction to GIS, the computer hardware, software, and personnel, used to input, store, analyze, and display spatial data. Studies its application to geological mapping and data analysis. Introduces students to GIS concepts and to practical issues of manipulating GIS software through exercises.

GEO 1442 Environmental Planning **4 QH**
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. (Core Category VI) *Prereq. GEO 1212 or permission of instructor.*

GEO 1444 Glacial and Pleistocene Geology **5 QH**
Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq. GEO 1222.*

GEO 1446 Hydrogeology **4 QH**
Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq. GEO 1212, MTH 1107 or 1123, or permission of instructor.*

GEO 1447 Groundwater Modeling **4 QH**
Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. *Prereq. Introductory calculus.*

GEO 1448 Groundwater Geochemistry **4 QH**
Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq. Two quarters of chemistry.*

GEO 1450 Geology Seminar **4 QH**
Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq. Major in geology or senior status.*

GEO 1712 Physical Geology (Honors) **4 QH**
Honors equivalent of GEO 1212. (Core Category II)

GEO 1722 Historical Geology (Honors) **4 QH**
Honors equivalent of GEO 1222. (Core Category II)

GEO 1754 Planetary Astronomy (Honors) **4 QH**
Honors equivalent of GEO 1154. (Core Category V)

GEO 1816, GEO 1817 Undergraduate Research **4 QH each**
Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study **4 QH each**
Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies **1 QH each**
Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

GEO 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

History

HST 1101 Western Civilization to 1648 **4 QH**
Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. *Not open to students who have completed HST 1121, HST 1701, or HST 4110.* (Core Category II)

HST 1102 Western Civilization Since 1648 **4 QH**
Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. *Not open to students who have completed HST 1122, HST 1702, or HST 4111.* (Core Category II)

HST 1121 World Civilization to 1648 **4 QH**
Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701, or HST 4110.* (Core Category IV)

HST 1122/IAF 1122 World Civilization Since 1648 **4 QH**
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102, HST 1702, or HST 4111.* (Core Category IV)

HST 1201 The United States to 1877 **4 QH**
Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (Core Category II)

HST 1202 The United States Since 1877 **4 QH**
Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (Core Category II)

HST 1241 The Historian's Craft **4 QH**
Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which s/he works. (Core Category II)

HST 1270 Introduction to Public History **4 QH**
Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1301 Topics in European History (Group A or B) **4 QH**
Covers topics in European history from antiquity to the present.

HST 1311 Ancient Greece (Group A) **4 QH**
Studies the origins and development of Greek civilization; political evolution of Hellenic society from tribal to city-state organization; and the growth and application of Greek religious, political, and ethical ideas.

HST 1315 Ancient Rome (Group A) **4 QH**
Examines Roman civilization in two sequences: the rise of Roman power under the Republic and the decline of Roman power under the Empire.

HST 1321 Medieval Europe (Group A) **4 QH**
Studies Europe from the fall of Rome to the fifteenth century; the expansion of Christianity; the growth of the power of the papacy; the development of monarchies; popular culture, heresy, and witchcraft; crusades; cathedrals, warriors, and saints. Emphasizes cultural and intellectual change. (Core Category III)

HST 1331 Renaissance Civilization (Group A) **4 QH**
Focuses on Europe from 1300 to 1600. Topics include political, economic, and social changes; advances in technology, science, and warfare; overseas expansion; changes in artistic vision; and struggles over religious and scientific beliefs. Emphasizes cultural and intellectual change. (Core Category III)

HST 1336 Luther and His Age (Group A) **4 QH**
Studies Martin Luther, John Calvin, Henry VIII, Elizabeth I, and their political and religious contemporaries who, between 1500 and 1650, overthrew the church's monopoly of religion, forged new relationships between princes and subjects, found new ways to create wealth, challenged the traditional roles of men and women in families and communities, and created new attitudes toward national and international politics.

HST 1355 Tudor England (Group A) **4 QH**
Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World. Provides hands-on experience with Tudor sources.

HST 1390 Population in European History (Group A or B) **4 QH**
Examines, through population studies, the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (Core Category III)

HST 1393 History of Science and Technology (Group A or B) **4 QH**
Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C) **4 QH**
Traces the history of nonpowered flight, beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci; from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1407 Europe, 1870–1921 (Group B) **4 QH**
Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe Since 1921 (Group B) **4 QH**
Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

HST 1424 Victorian England (Group B) **4 QH**
Discusses the economic, social, and political life of the English people during Victoria's reign. (Core Category IV)

HST 1425 The Decline of Great Britain (Group B) **4 QH**
Discusses the economic, social, and political life of the English people in the twentieth century. (Core Category IV)

HST 1433 The French Revolution and Napoleon (Group B) **4 QH**
Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.

HST 1441 Hitler's Germany (Group B) **4 QH**
Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.

HST 1451 Imperial Russia (Group B) **4 QH**
Focuses on the emergence of Russia as a recognized European power, westernization and expansion in the eighteenth century, the impact of Napoleon, and reform and revolution.

HST 1452 Soviet Russia (Group A) **4 QH**
Examines forces molding the history of Russia since 1917, internal developments, and foreign relations.

HST 1472 The Family in European History (Group B) **4 QH**
Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.

HST 1473 Women in Modern Europe (Group B) **4 QH**
Examines the history of women in Western Europe from the French Revolution of 1789 to the present, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.

HST 1481 The Culture of Europe (Group B) **4 QH**
Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (Core Category III)

HST 1485 Communism and Revolution (Group B) 4 QH
Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490/INT 1150/SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C) 4 QH
Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. (Core Category II)

HST 1491 Modern Western Economic History (Group B or C) 4 QH
Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (Core Category III)

HST 1493 Work and Leisure (Group B or C) 4 QH
Examines the historical evolution of contemporary patterns of work and leisure across cultural, sexual, and class lines. Topics include the impact of machine technology on the worker and the workplace, workers organizing in unions and professional groups, changing concepts of the use of time, women's work and women's leisure; recreation and sports (both participant and spectator); and the rise of the cafe and the saloon as sociable institutions. (Core Category III)

HST 1494 History and Film (Group B or C) 4 QH
Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (Core Category II)

HST 1495 Technological Transformations of Society (Group B, C, or D) 4 QH
Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.

HST 1496 War in the Twentieth Century (Group B, C, or D) 4 QH
Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World Since 1945 (Group B, C, or D) 4 QH
Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C) 4 QH
Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C) 4 QH
Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (Core Category III)

HST 1511 The American Revolution (Group C) 4 QH
Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C) 4 QH
Focuses on the events surrounding the southern effort to expand slavery into the territories that led to the Civil War. Emphasizes the significant impact of Abraham Lincoln upon the war's outcome. Also examines Reconstruction, the effort to reunite the North and South at war's end, and explores the major role that African-Americans played throughout the period.

HST 1516 The United States, 1898–1939 (Group C) 4 QH
Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939–1960 (Group C) 4 QH
Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States Since 1960 (Group C) 4 QH
Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525/AFR 1131 African-American History 1 to 1900 (Group C) 4 QH
Covers the development of black America from slavery through the Booker T. Washington–W.E.B. DuBois controversy, with emphasis on the historical links between Africa and America that have shaped the African-American experience. Includes in-depth discussion of slavery's impact, the role of the antebellum free black, the Civil War and Reconstruction, and the black response to the new racism of the late nineteenth century. (Core Category III)

HST 1526/AFR 1132 African-American History 2 Since 1900 (Group C) 4 QH
Examines the modern development of black America, with major emphasis on the twentieth century and the rising tide of African-American nationalism. Provides an historical perspective regarding key contemporary issues, including the founding of the NAACP, the Marcus Garvey back-to-Africa movement, the Harlem Renaissance, the Black Muslims, the impact of Martin Luther King, and the idea of Black Power.

HST 1531 New England History (Group C) 4 QH
Examines the history of New England from its first settlement by Native Americans to its condition in the late twentieth century. Encompasses a variety of topics, including geography, discovery, exploration, settlement, immigration, politics, industrialization, transportation, and urbanization.

HST 1533 History of Boston (Group C) 4 QH
Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

HST 1537 Latin America and the Caribbean in Boston (Group C) 4 QH
Explores the experiences of Latin American and Caribbean origin groups—particularly Brazilians, Central Americans, Dominicans, Haitians, Puerto Ricans, and West Indians—in twentieth-century Boston. Studies the historical, economic, political, and cultural forces affecting immigration from each country.

HST 1538 History of Latinos(-as) in the United States (Group C) 4 QH
Examines the history and experiences of the major Latino subgroups—Chicanos, Cubans, and Puerto Ricans—and the new immigrants from Central America and the Caribbean. Studies historical events in the context of the larger "American"—North and South—experiences. Topics include United States' expansion and imperialism in the Southwest and the Caribbean; migration patterns; forms of ethnic nationalism; political participation and mobilization; migratory labor and immigration policies; gender and class distinctions; cultural expressions; the effects of post-industrialization and economic restructuring; and interethnic relations.

HST 1539 American Jewish History (Group C) 4 QH
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.

HST 1543 American Urban History (Group C) 4 QH
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (Core Category VI)

HST 1544 Environmental History of the United States (Group C) 4 QH
Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (Core Category VI)

HST 1548 American Cultural History to 1860 4 QH
Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.

HST 1549 American Popular Cultural History Since 1860 4 QH
Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of advertising and consumerism, technological change and its meaning, the rise of sports, suburban life from the 1950s onward, 1960s "counter culture," and neo-conservatism. Emphasizes the interaction of a wide range of cultural forms, including popular literature and music, film, television, and the mail-order catalog.

HST 1553 The Family in American History (Group C) 4 QH
Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.

HST 1555 American Elites (Group C) 4 QH
Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.

HST 1556 History of the American Home (Group C) 4 QH
Studies the American home from 1600 to the present. Extensively uses visual materials to develop an above-ground "archeology" of the American home to teach students how things—furnishings, buildings, landscape—contain hidden meanings that can reveal the intimate details of the everyday lives of ordinary and extraordinary Americans. Includes analysis of the ways in which the broader political, economic, and social issues of the past were reflected in Americans' physical surroundings.

HST 1559 Women in America, 1914–Present (Group C) 4 QH
Examines themes in the history of women in America from World War I to the present. Studies the experiences of women in the World Wars, in the labor force and in the labor movement, women's activities in social movements, their experience of the Depression of the 1930s, women's private lives in the family, and sexuality.

HST 1563 History of Sport in America (Group C) 4 QH
Provides a history of the major sports and their impact on American life.

HST 1571 American Business History (Group C) 4 QH
Examines the rise of business in America. Studies the role of the corporation, horizontal and vertical combinations, business and labor, and business and government.

HST 1575 History of Media in America (Group C) 4 QH
Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.

HST 1577 America and the Sea (Group C) 4 QH
Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

HST 1578 The Automobile in America (Group C) 4 QH
Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.

HST 1581 The Gilded Age and the Progressive Era, 1877–1920 4 QH
Examines the transformation of American society and its economy and analyzes how government responded to these sweeping changes from the 1870s through World War I.

HST 1582 The Growth of American Government Since 1935 (Group C) 4 QH
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.

HST 1586 American Military History (Group C) 4 QH
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.

HST 1591 American Images of China (Group C or D) 4 QH
Examines the relationship between Sino-American international relations and changes in American popular perceptions of China as revealed in the media and literature. Focuses on Sino-American relations since the nineteenth century, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.

HST 1592 History of the Vietnam War (Group C or D) 4 QH
Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.

HST 1601 Canadian History (Group D) 4 QH
Explores the history of Canada from the time of the arrival of the First Nations to the present, with emphasis on Canadian relations with the United States and on the background of the Quebec separatist movement.

HST 1604 Modern Latin America (Group D) 4 QH
Traces the developments in this region since independence and the inception of nationhood. Topics include: state formation and society in the nineteenth century; economic development and underdevelopment in the region; race, class, and ideology; United States/Latin American relations; populism; the roots of revolution and authoritarianism; and the contemporary experiments with neo-liberal policies.

HST 1605 The Modern Caribbean (Group D) 4 QH
Focuses on the social, economic, and cultural forces that have shaped the character of the Caribbean people. Examines the variety of societies, cultures, and institutions of the region in their historical and contemporary settings, beginning with pre-Colombian cultures, moving through the colonial period, plantation agriculture, slavery, the expansion of U.S. influence, urbanization, economic development models, authoritarian politics, and the contemporary migration of Caribbean people to the United States and Europe.

HST 1610 Topics in Asian History (Group D) 4 QH
Covers special topics in the history of Asia.

HST 1612 The Modern Middle East (Group D) 4 QH
Focuses on the Middle East since 1800, with emphasis on the background of present problems. (Core Category VI)

HST 1613 The Contemporary Middle East (Group D) 4 QH
Focuses on political, economic, and social developments in the Middle East since World War II.

HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D) 4 QH
Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.

HST 1620/AFR 1191 Early African Civilization (Group D) 4 QH
Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800.

HST 1621/AFR 1197 Modern African Civilization (Group D) 4 QH
Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. (Core Category IV)

HST 1623/AFR 1403 West African History (Group D) 4 QH
Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria.

HST 1625/AFR 1405 South African History (Group D) 4 QH
Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting.

HST 1628/AFR 1628 The African Diaspora (Group D) 4 QH
Explores the creation and transformation of the African Diaspora—connections among communities of African descent in Africa, the Americas, Europe, and Asia. Centers on the years from 1500 to the present and emphasizes connections among the themes of migration, identity, and popular culture.

HST 1633 Modern China (Group D) 4 QH
Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.

HST 1634 Contemporary China (Group D) 4 QH
Examines Chinese policy, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.

HST 1637 The Making of Modern Japan: From Samurai to Sony (Group D) 4 QH
Surveys the evolution of Japan from a Third World nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.

HST 1644 Third World Women 4 QH
Explores the complex gender dynamics of women in non-Western societies during the years of Western imperialist domination, nationalist resistance struggles, and post-colonialism. Begins by deconstructing the term "Third World" and seeing how that term can be read against the context of imperialism. Examines gender constructs in the Third World through a variety of written and visual materials, including autobiographical accounts, ethnographies, historical fiction, films, and slides. Topics include patterns of gender domination and female resistance, the interplay of race and gender hierarchies under colonial rule, the Western gaze and representations of Third World "primitive" women, the feminization of labor and the global economy, reproductive strategies, and sex trafficking. (Core Category IV)

HST 1652 Islam Resurgent (Group D) 4 QH
Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (Core Category VI)

HST 1701 Western Civilization 1 (Honors) 4 QH
Honors equivalent of HST 1101.

HST 1702 Western Civilization 2 (Honors) 4 QH
Honors equivalent of HST 1102.

HST 1711 America to 1877 (Honors) 4 QH
Honors equivalent of HST 1201.

HST 1712 America Since 1877 (Honors) 4 QH
Honors equivalent of HST 1202.

HST 1790 Population in European History (Group A or B) (Honors) 4 QH
Honors equivalent of HST 1390.

HST 1801 Directed Study 4 QH

HST 1805 Senior Research Seminar 4 QH
The capstone course of the undergraduate history major. Gives students an opportunity to pursue a major research project of their own choosing under the close supervision of faculty. Emphasizes the techniques of research and interpretation of research findings. Gives special attention to methodology and to the incorporation of methodological perspectives in research and writing.

HST 1811, HST 1812, HST 1813, HST 1814 4 QH each
Junior/Senior Honors Program
For details, contact the honors office.

HST 1821 Fieldwork in History 1 4 QH
Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. *Prereq. HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses. College of Arts and Sciences experiential education requirement.*

HST 1888, 1889 Experiential Education Directed Study 4 QH each
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Human Services

HS 1101/ED 1302 The Human Services Professions 4 QH
Explores what a human service agency is, how it comes into being, and how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq. ED 1100, SOC 1100, or equivalent.*

HS 1210/ED 1309 Intervention Strategies for the Human Services 4 QH
Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

HS 1240/SOC 1240 Sociology of Human Service Organizations 4 QH
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

HS 1260/SOC 1324 Human Services Research and Evaluation 4 QH
Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethic formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. Requires team service-learning projects. *Prereq. SOC 1320 or other statistics, SOC 1240, or permission of instructor.*

HS 1333 Senior Seminar in Human Services 4 QH
Designed for seniors in human services. Examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

HS 1336, HS 1337 Field Internship in Human Services 1 and 2 6 QH each
Human services students are required to fulfill two internship placements during the last two years of their program. Each placement consists of 150 hours on-site and varies according to the students' interests. Examples of placement sites include community centers, nursing homes, vocational workshops, state and

federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. *College of Arts and Sciences experiential education requirement. Prereq. Junior or senior standing and approval by the Human Services Internship coordinator by early in quarter previous to planned quarter of internship.*

HS 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Interdisciplinary Courses

INT 1121/LNS 1121/SOA 1121 **4 QH**
Introduction to Latino, Latin American, and Caribbean Studies
Offers an interdisciplinary introduction to Latinos and people of Latin American and Caribbean origin in the United States as well as to the regions of Latin America and the Caribbean. Dispels a series of powerful myths associated with U.S. Latinos and in Latin American and Caribbean society, such as racial inferiority, poverty, machismo, and violence. Introduces the construction of Latino, Latin American, and Caribbean identities as well as the politics, economics, history, and culture.

INT 1150/SOC 1150 **4 QH**
Introduction to Women's Studies: Image, Myth, and Reality
Surveys the issues and methodologies involved in the interdisciplinary study of women. Examines the political, economic, social, and historical processes that have created both the image and the reality of women in societies. Guest lecturers provide an overview of the diverse disciplinary approaches to the study of women. (Core Category II)

INT 1201 An Analysis of American Racism **4 QH**
Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World **4 QH**
Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. A comprehensive interdisciplinary introduction to the oceans. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq. Permission of instructor.*

INT 1216 Maritime History of New England **4 QH**
Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq. Permission of instructor.*

INT 1217 Water: Planning for the Future **4 QH**
Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems in all their dimensions—political, economic, and technological. *Prereq. Permission of instructor.* (Core Category VI)

INT 1219 Advanced Seminar in Marine Studies **4 QH**
Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines, including scientific, legal, economic, and technical aspects of issues, that come into play in marine affairs. Seminars are lead by experts actively involved in the issues.

INT 1220 Coastal Zone Management **4 QH**
Focuses on outstanding issues in coastal environmental affairs. Discusses scientific, legal, economic, and technical aspects of coastal issues, and integrates them into problem-solving exercises. *Prereq. Permission of instructor.*

INT 1302 Feminist Perspectives on Society **4 QH**
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that analyzes issues affecting women's health and safety, including violence against women and abortion. Considers and evaluates women's views of social life and recognizes differences among women, including perspectives of women of color. (Core Category VI)

INT 1320 Exploring the Humanities Through Film **4 QH**
Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents films for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (Core Category II)

INT 1570 On Understanding Science **4 QH**
Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications **4 QH**
Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq. BIO 1261.*

INT 1702 War Work: The Experience of World War II (Honors) **4 QH**
Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1709 Cultural Passages in the Arts—Boston **4 QH**
Exposes students to the richness of the Boston cultural environment through a directed field study with various Northeastern University faculty. Students will be required to keep a detailed journal and produce a final creative project. Field trips will include various museums, theaters, and some neighborhoods within the city of Boston.

INT 1715 Iceland (Honors) **4 QH**
Honors interdisciplinary seminar on the history, Nordic literature, and geology of Iceland.

INT 1721 Modernism: Art, Film, and Literature (Honors) **4 QH**
Honors equivalent of INT 1321.

INT 1899 Advanced Television Production **4 QH**
Provides students with guidance in the development of special projects in television and video production. Studies advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and post-production technology. Students involved in the Northeastern Student Network project may also receive credit.

International Affairs

IAF 1100 Introduction to International Affairs **4 QH**
Introduces the study of international affairs through lectures, guest lectures, discussions, case studies, films, and readings across disciplines. Provides students with a basis for understanding the global village. Covers a range of issues including politics, economics, history, society and culture, and the environment.

IAF 1104/SOA 1104 Cultures of the World **4 QH**
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (Core Category II)

IAF 1112/POL 1112 Introduction to International Relations **4 QH**
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (Core Category II)

IAF 1113/POL 1113 Introduction to Foreign Governments **4 QH**
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

IAF 1122/HST 1122 World Civilization Since 1648 **4 QH**
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of the American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. (Core Category IV)

IAF 1190/ECN 1190 The Global Economy **4 QH**
Introduces the history, structure, and growth of the international economy. Considers dimensions of global economic interdependence, including population, foreign investment, and environmental spillovers. Analyzes a few key economic issues of current importance for major regions of the world, such as economic integration in Western Europe or the emergence of the East Asian dragons.

IAF 1300 International Conflict and Negotiation **4 QH**
Introduces students to the dynamics of conflict in the international arena: how conflicts evolve, fester, and are managed and resolved. Covers different types of regional and international conflicts, focusing on historical, economic, social, and political aspects of a variety of conflicts and the consequences they hold for regional and international actors. (Core Category V)

IAF 1330/ECN 1191 Development Economics **4 QH**
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (Core Category V)

IAF 1400 International Experience Workshop **4 QH**
Provides an opportunity for students who have completed their International Experience requirement for the major or minor in international affairs to participate in a workshop coordinated by a faculty member of the program. Students will prepare materials for the class relating to the political, social, economic, historical, and cultural aspects of the countries where they have studied, worked, or interned. (This course is open to other students who have comparable international experience.) *Fulfills the college's experiential education requirement for international affairs majors.*

IAF 1870 Senior Seminar in International Affairs **4 QH**
Develops one or two main topics to be decided by the instructor in consultation with faculty and students in the International Affairs program. Topics, which will vary from year to year, may include, for example, emerging economies, world trade, arms control, and global stability.

IAF 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Journalism

JRN 1103 Newswriting 1 **4 QH**
Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required.

JRN 1104 Newswriting 2 **4 QH**
Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq. JRN 1103 with grade of C or better.*

JRN 1105 Computer-Assisted Reporting **4 QH**
Introduces novices to the computing skills needed by today's journalists, yet holds sufficient challenges for those who have already found their way onto the World Wide Web. Presents material in two sections. Part one, Using the Internet, contains parallel study of using the Internet to enhance news stories published in familiar formats such as newspaper, magazine, radio, and television, and using the Internet to publish material. Part two, Database Computer Skills for Journalists, focuses on the many sources of information available via computer that can be reconfigured to help reporters research and write a news story. *Prereq. JRN 1103 with grade of C or better.*

JRN 1206 Editing **4 QH**
Provides practice in copy editing, headline writing, and origination editing. Presents assignments in photo selection, cropping, and cutline writing. Introduces page layout. Students may fulfill their experiential learning requirement by working on school and parent newspapers and newsletters with neighborhood public schools and writing a paper evaluating the experience. *Fulfills the college's experiential education requirement for journalism majors. Prereq. JRN 1104 with grade of C or better and middler status.*

JRN 1250 Interpreting the Day's News **4 QH**
Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (Core Category VI) *For nonmajors as well as majors.*

JRN 1301 Basic Photojournalism **4 QH**
Covers camera procedures, cropping assignment techniques, theory, and photo caption methods.

JRN 1305 Techniques of Journalism **4 QH**
Provides practice in writing in-depth and multiplesource stories requiring significant research. Provides an introduction to investigative reporting, practice in feature writing, and a review of legal issues. *Prereq. JRN 1104.*

JRN 1320 Radio News Gathering and Reporting **4 QH**
Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq. JRN 1103.*

JRN 1336 Public Relations Principles **4 QH**
Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq. Upperclass standing.*

JRN 1350 Advertising Principles **4 QH**
Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq. Upperclass standing.*

JRN 1421 Television Newswriting **4 QH**
Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq. JRN 1103, with a grade of C or better, or permission of instructor.*

JRN 1422 Television News Production **4 QH**
Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq. JRN 1421.*

JRN 1423 Documentary Production **4 QH**
Has two principle emphases: 1) provides students with an opportunity to research and produce short video documentaries and 2) acquaints students with a range of professional documentary work through screenings and discussions. Working either individually or in collaboration with up to two other class members, students will have the opportunity to propose, research, shoot, write, and edit video documentary projects that will be screened at the end of the quarter. *Prereq. JRN 1422 or permission of instructor.*

JRN 1432 Local Reporting **4 QH**
Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq. JRN 1104 with a grade of C or better.*

JRN 1440 Design and Graphics **4 QH**
Applies layout and design principles to newspapers, magazines and other print media. Covers type faces, copy measuring, dummying, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq. JRN 1206.*

JRN 1451 Advertising Copy Writing **4 QH**
Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail. Emphasizes fact gathering, copy structure, and advertising design. *Prereq. JRN 1103, and JRN 1350, or permission of instructor.*

JRN 1460 Public Relations Problems **4 QH**
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq. JRN 1336.*

JRN 1501 History of Journalism **4 QH**
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq. Upperclass standing.*

JRN 1508 Law of the Press **4 QH**
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq. Upperclass standing.*

JRN 1512 Journalism Ethics and Issues **4 QH**
Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required. *Prereq. Junior or senior status.*

JRN 1522 Magazine Writing **4 QH**
Covers writing and freelancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq. JRN 1104, with a grade of C or better.*

JRN 1552 Advertising Practice **4 QH**
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq. JRN 1451.*

JRN 1561 Public Relations Practice **4 QH**
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq. JRN 1103 and JRN 1336.*

JRN 1703 Newswriting 1 (Honors) **4 QH**
Honors equivalent of JRN 1103.

JRN 1704 Newswriting 2 (Honors) **4 QH**
Honors equivalent of JRN 1104.

JRN 1870, JRN 1880 Seminar **4 QH each**
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq. Upperclass standing.*

JRN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

JRN 1890 Directed Study in Journalism **4 QH**
Prereq. Permission of instructor.

JRN 1892 Topics: Beat Reporting **4 QH**
Prereq. Permission of instructor.

JRN 1894, JRN 1895, JRN 1896, JRN 1897 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

JRN 1899 Advanced TV Production **4 QH**
Provides students with guidance in the development of special projects in television and video production. Studies advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and post-production technology. Students involved in the Northeastern Student Network project may also receive credit. *Prereq. Permission of instructor.*

Linguistics

LIN 1118/ENG 1118 Introduction to Language and Linguistics 1 **4 QH**
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (Core Category II)

LIN 1119/ENG 1119 History of the English Language **4 QH**
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills/journals, and private and public letters. *Prereq. ENG 1110, ENG 1111, or equivalent.* (Core Category III)

LIN 1215/PHL 1215 Symbolic Logic **4 QH**
Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (Core Category II)

LIN 1218/ENG 1218 Introduction to Language and Linguistics 2 **4 QH**
A workshop that focuses on three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that underlie the linguistics system inside each language user's mind, with a slant toward "doing" linguistics: working with data, analyzing it, and ultimately explaining it. *Prereq. LIN 1118/ENG 1118 or permission of instructor.*

LIN 1220/LNL 1220 Introduction to Phonetics and Phonology **4 QH**
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LIN 1231/AFR 1231 African-American English **4 QH**
Addresses topics in the study of African-American English or Ebonics. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in schools.

LIN 1235/LNL 1235 Applied Linguistics **4 QH**
Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LIN 1240/LNL 1240 Bilingualism **4 QH**
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LIN 1245/LNF 1250 History of the French Language **4 QH**
Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq. Reading knowledge of French or permission of instructor.*

LIN 1250/ASL 1250 Linguistics of American Sign Language **4 QH**
Introduces the basic issues of linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq. ENG 1118 and the ability to follow lectures in ASL.*

LIN 1255/LNS 1250 History of the Spanish Language **4 QH**
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of Old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LIN 1260/LNL 1260 Introduction to Romance Linguistics **4 QH**
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronoun use. Conducted in English. *Prereq. Reading knowledge of one Romance language or permission of instructor.*

LIN 1262/PSY 1262 Psychology of Language **4 QH**
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

LIN 1263/PSY 1263 Nonverbal Communication **4 QH**
Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq. PSY 1112 or PSY 1113.*

LIN 1335/SOA 1335 Language and Culture **4 QH**
Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and creoles. Includes several field assignments.

LIN 1362/PSY 1362 Child Language **4 QH**
Examines how language develops in children. *Prereq. LIN 1118, PSY 1262 or permission of instructor.*

LIN 1364/PSY 1364 Cognition **4 QH**
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

LIN 1365/PSY 1365 Language and the Brain **4 QH**
Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq. PSY 1262 or permission of instructor.*

LIN 1401/ENG 1401 Introduction to Syntax **4 QH**
Offers an introduction to the mental rules that speakers of any language unconsciously follow when they combine words into meaningful sentences and when they decode the strings of sounds that they hear every day. Examines sentence structure, syntactic principles, universal grammar, and innateness in a Chomskyan generative framework. (Core Category V)

LIN 1407/ENG 1407 Introduction to Semantics **4 QH**
Focuses on meaning and how it is expressed in language through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what way is linguistic meaning determined by our perceptual system or our culture?

LIN 1408/ENG 1408 Topics in Linguistics **4 QH**
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.

LIN 1415/AFR 1415 African Language **4 QH**
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students will explore the classification of African languages, the application

of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

LIN 1440/PHL 1440 Philosophy of Language **4 QH**
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quoin, Russell, Chomsky, and Fodor. *Prereq. Permission of instructor.*

LIN 1499/PSY 1499 Psychology of Reading **4 QH**
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq. PSY 1262 or PSY 1364.*

LIN 1562/PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1261 or PSY 1364.*

LIN 1564/PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1354 or PSY 1262.*

LIN 1661/PSY 1661 Seminar in Psycholinguistics **4 QH**
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1662/PSY 1662 Seminar in Cognition **4 QH**
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1692 Seminar in Linguistics **4 QH**
Specific topics vary by quarter.

LIN 1693 Seminar in Linguistics **4 QH**
Specific topics vary by quarter.

LIN 1801 Directed Study **1 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1802 Directed Study **2 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1803 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1804 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Mathematics

MTH 1000 Mathematics Preliminaries 1 **4 QH**
Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; operations on polynomials; solving simple first degree equations; and laws of exponents. *Prereq. Permission of course coordinator.*

MTH 1010 Mathematics Preliminaries 2 **4 QH**
Supplies, together with MTH 1000, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes solving first and second-degree equations and systems of equations; graphic lines and parabolas; solving equations with algebraic fractions; solving word problem applications. *Prereq. Permission of course coordinator.*

MTH 1101 Applications of Algebra **4 QH**
Examines linear equations and their graphs, and systems of linear equations and linear inequalities in two variables, with application to linear programming. Introduces matrices with application to Markov chains; set theory, techniques of counting; permutations and combinations and elementary probability. (Core Category I)

MTH 1102 Interactive Mathematics **4 QH**
Offers hands-on exploration of real-life situations, developing concepts from algebra, statistics, and linear programming as needed. Emphasizes problem-solving strategies. Designed for students who enjoy working in collaborative groups. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Core Category I).

MTH 1106 Functions and Algebra **4 QH**
Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane. *Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.*

MTH 1107 Functions and Basic Calculus **4 QH**
Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (Core Category I) *Prereq. MTH 1106. Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.*

MTH 1108 Basic Calculus 2 **4 QH**
Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations. *Prereq. MTH 1107.*

MTH 1113 College Mathematics for Business and Economics **4 QH**
Focuses on the analytic, geometric, and numerical properties of linear, exponential, logarithmic, polynomial, and logistic functions. Studies these functions in the context of using them to model a variety of situations in economics and business including simple and compound interest, mortgages, and the present and future value of both one-time payments and multiple payments/withdrawals. A graphing calculator is required for this course.

MTH 1114 Calculus for Business and Economics **4 QH**
Studies functions, derivatives, differential of polynomials, exponential functions and logarithmic functions; graphics functions using maximum, minimum, inflection points; and optimization in nonlinear problems; marginal analysis of cost, revenue, profit functions. Emphasizes work problems and applications. A graphing calculator is required for this course; the TI-83 is strongly recommended. *Prereq. MTH 1113 or equivalent. Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2 **6 QH each**
Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1 **4 QH**
Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2 **4 QH**
Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. *Prereq. MTH 1123.*

MTH 1125 Calculus for Engineering Majors 3 **4 QH**
Introduces Taylor polynomials and series; studies differential equations and mathematical models. *Prereq. MTH 1124.*

MTH 1133 Calculus for Life Sciences 1 **4 QH**
Begins with the fundamentals of differential calculus and proceeds to specific problems encountered in biological research. Studies the formulation of physiological problems in terms of differential equations; solutions of differential equations by method of undetermined coefficients; and application to compartmental problems.

MTH 1134 Calculus for Life Sciences 2 **4 QH**
Studies integral calculus; trigonometric functions; solutions of differential equations by separation of variables; and advanced compartmental problems. Introduces pharmacokinetics, numerical integration, and Euler's method. *Prereq. MTH 1133.*

MTH 1135 Calculus for Life Sciences 3 **4 QH**
Presents functions of several variables, Taylor polynomials, and infinite series. *Prereq. MTH 1134.*

MTH 1137 Discrete Mathematics **4 QH**
Covers logic, binary arithmetic, basis set theory, Boolean algebra, and logic gates and their close interconnections. Also studies functions, permutations, combinatorics, proof by induction, algorithms, recursion, and recurrence relations. *Prereq. MTH 1123.*

MTH 1140 Calculus for Science Majors 1 **4 QH**
The sequence MTH 1140–2 is equivalent to MTH 1123–5, but geared toward majors in mathematics, physics, chemistry, and computer science. MTH 1140 introduces differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average and instantaneous rates of change, derivatives, and the chain rule. Covers applications of the derivative to curve sketching, related rates, and optimization.

MTH 1141 Calculus for Science Majors 2 **4 QH**
Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. *Prereq. MTH 1140.*

MTH 1142 Calculus for Science Majors 3 **4 QH**
Introduces Taylor polynomials and series; studies differential equations and mathematical models. *Prereq. MTH 1141.*

MTH 1143 Calculus for Science Majors 4 **4 QH**

MTH 1150 Probability, Statistics, and the Computer **4 QH**
Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. (Equivalent to MTH 1103.) *Prereq. Nonmath majors.*

MTH 1152 Statistical Thinking **4 QH**
Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings from a wide variety of sources. Uses extensive class discussion and homework problems to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (Core Category II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1170 Mathematical Discovery and Computers **4 QH**
Introduces the computer as a tool for mathematical discovery as well as an object of study. Both the mathematical and computer components may vary, but there will always be an emphasis on the nature of mathematical exploration and the solving of challenging problems.

MTH 1188 Problem Solving and Pre-Calculus 1 **6 QH**
Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions. A graphing calculator is required for this course; the TI-83 is strongly recommended. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2 **6 QH**
Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Equivalent to MTH 1192.)

MTH 1191 College Algebra **4 QH**
Examines laws of exponents, factoring, operations with fractional expressions, radical and complex numbers, Pythagorean Theorem and distance formula, linear and quadratic equations and inequalities, and functional notation. Includes graphing of a wide variety of functions and equations, including liens, conic sections, and polynomials. Studies solutions to many types of equations, including linear, quadratic, and polynomial. Explores many applications of algebra. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. *Prereq. BSET majors only. Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus **4 QH**
Studies exponential and logarithmic functions, trigonometric functions of angles and degrees and radians, trigonometric identities and equations, right triangles, law of sines and cosines, inverse trigonometric functions, and polar coordinates. Examines complex numbers in trigonometric form, systems of linear and nonlinear equations, binomial theorem, arithmetic and geometric sequences and series. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Equivalent to MTH 1189.) *Prereq. MTH 1191 or MTH 4107; BSET majors only.*

MTH 1193 Calculus 1 **4 QH**
Studies general function operations, theory and evaluation of limits, derivatives of algebraic and trigonometric functions, general rules of differentiation, Rolle's Theorem, and Mean Value Theorem. Covers applications of differentiation including velocity and acceleration, related rates, maximum and minimum problems, curve sketching, and approximations by differentials. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Not equivalent to MTH 1123.) *Prereq. MTH 1192 or MTH 4108; BSET majors only.*

MTH 1194 Calculus 2 **4 QH**
Begins with antidifferentiation and the solution of problems solved by simple differential equations. Examines the Riemann sum and the development of the fundamental theorem with applications to areas, volumes, and rectilinear motion problems. Topics include logarithmic, exponential, and inverse trigonometric functions and their applications. Studies techniques of integration including parts, partial fractions, substitution, and the use of tables, L'Hôpital's rule, improper integrals, and geometry of vectors in a plane and space. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Not equivalent to MTH 1124.) *Prereq. MTH 1193 or MTH 4120; BSET majors only.*

MTH 1195 Calculus 3 **4 QH**
Begins with sketching surfaces in space, leading to a study of functions of several variables, partial derivatives, and multiple integrals with applications to area and volume. Studies sequences and series to the development of Taylor and Maclaurin series. Introduces differential equations including the solution, with applications, of first-order variables separable, first-order linear, and second-order linear homogeneous. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Not equivalent to MTH 1125.) *Prereq. MTH 1194 or MTH 4121; BSET majors only.*

MTH 1196 Introductory Statistics/Differential Equations **4 QH**
Studies measures of central tendency, measures of variability, frequency distributions and the normal curve, percentiles and standard scores, correlation, inferential statistics, differences between means, analysis of variance (ANOVA), and nonparametric tests. Examines various types of differential equations and methods of solution, including first-order equations with variables separable and first-, second-, and higher-order homogeneous and nonhomogeneous linear equations with constant coefficients. Emphasizes applications and numerical methods throughout the entire course. A graphing calculator is required; either the TI-83 or TI-86 is strongly recommended. *Prereq. MTH 1994 or MTH 4121; BSET majors only.*

MTH 1203 History of Mathematics **4 QH**
Traces the development of the various branches of mathematics from ancient times to the present, with emphasis on the mathematics itself as well as the mathematicians and cultures that produced it. Teaches students to compute in other number systems, to perform geometric constructions, and to learn proofs of some significant theorems. (Core Category III) *Prereq. Interest in history and mathematics.*

MTH 1212 Linear Programming **4 QH**
Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (Core Category II) *Prereq. One year of college mathematics.*

MTH 1223 Calculus for Engineering Majors 4 **4 QH**
Covers partial derivatives and multiple integrals, with applications. *Prereq. MTH 1125.*

MTH 1225 Differential Equations (Engineering) 1 **4 QH**
Studies ordinary differential equations with applications including mechanical vibrations and electrical circuits. Focuses on first-order equations and systems and second-order linear equations studied from various points of view: existence theory, analytic solution techniques (including Laplace transform), and numerical methods. Uses computer labs for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1226 Differential Equations (Engineering) 2 **4 QH**
Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq. MTH 1225 or equivalent.*

MTH 1230 Linear Algebra for Engineers **4 QH**
Introduces matrices through Guassian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq. MTH 1225.*

MTH 1238 Combinatorial Mathematics **4 QH**
Introduces techniques of mathematical proofs, including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion, Polyaenumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq. Two courses in calculus.*

MTH 1240 Chaos and Fractals **4 QH**
Presents an experimental study, using simple mathematical models, of chaotic behavior in dynamical systems found in mathematics, science, and computer science. Goals include the development of experimental skills, integration of visual and analytical modes of thought, and an appreciation of issues of problem formulation and representation. *Prereq. MTH 1125, MTH 1137, and COM 1201 or equivalent.*

MTH 1243 Calculus for Science Majors 4 **4 QH**
Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq. MTH 1142.*

MTH 1244 Calculus for Science Majors 5 **4 QH**
Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq. MTH 1243.*

MTH 1245 Differential Equations (Science) 1 **4 QH**
Studies ordinary differential equations with applications. Focuses on first-order equations and systems and second-order linear equations studied from various points of view: existence theory, analytic solution techniques, and numerical methods. Introduces linear algebra, including eigenvalues and eigenvectors to study systems of equations. Uses computer labs for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1246 Differential Equations (Science) 2 **4 QH**
Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq. MTH 1245 or equivalent.*

MTH 1301 Linear Algebra 1 **4 QH**
Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq. MTH 1244 or equivalent.*

MTH 1302 Linear Algebra 2 **4 QH**
Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq. MTH 1301.*

MTH 1311 Real Analysis 1 **4 QH**
Provides the theory and technique for a rigorous treatment of calculus. Topics vary and may include the construction of the real numbers, continuity and convergence, differentiation and integration, and proofs of selected results such as the inverse and implicit function theorems. Emphasizes careful proofs throughout. *Prereq. MTH 1125 and 1238 or permission of instructor.*

MTH 1321 Introduction to Groups and Their Applications **4 QH**
Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.

MTH 1322 Topics in Rings, Fields, and Number Theory **4 QH**
Introduces commutative rings, ideals, integral domains, fields, and Galois theory. Studies extension fields, Gaussian integers, and other topics as time permits. *Prereq. MTH 1321.*

MTH 1330 Number Theory **4 QH**
Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq. MTH 1301 or permission of instructor.*

MTH 1337 Foundations of Mathematics 1 **4 QH**
Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (Core Category V)

MTH 1347 Applied Analysis **4 QH**
Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq. MTH 1246 or permission of instructor.*

MTH 1349 Numerical Analysis 1 **4 QH**
Presents various topics including roots of nonlinear equations, systems of linear equations, interpolation, curve-fitting, and approximation of functions. Emphasizes understanding issues such as how good a numerical solution is or how efficient a method is, rather than theorem-proving or numerical recipes.

MTH 1350 Numerical Analysis 2 **4 QH**
Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349.

MTH 1351 Functions of a Complex Variable 1 **4 QH**
Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq. MTH 1243 or equivalent.*

MTH 1352 Functions of a Complex Variable 2 **4 QH**
Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq. MTH 1351.*

MTH 1360 Seminar in Applied Mathematics **4 QH**
Offers students of mathematics the experience of utilizing their skills to study problems that arise in industry and other "real-world" settings. Provides students with the opportunity to build on exciting industrial experiences that they may have had through co-op or other employment. *Arts and Sciences experiential education requirement. Prereq. Junior or senior status and some experience or interest in applied mathematics.*

MTH 1367 Geometry **4 QH**
Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq. Basic linear algebra or permission of instructor.*

MTH 1384 Probability for Engineering **4 QH**
Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq. MTH 1223 and MTH 1225 or equivalent.*

MTH 1387 Probability 1 **4 QH**
Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; Law of Large Numbers; and central limit theorem. *Prereq. MTH 1223 or MTH 1244.*

MTH 1388 Probability 2 **4 QH**
Studies selected topics, including introduction to stochastic processes, with emphasis on Markov chains or random walk. *Prereq. MTH 1384 or MTH 1387.*

MTH 1390 Mathematical Statistics **4 QH**
Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. *Prereq. MTH 1384 or MTH 1387.*

MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726, MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741, MTH 1742, Honors Program **4 QH each**
Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1223, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, and MTH 1142, respectively.

MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805, MTH 1806, MTH 1807, MTH 1808 Directed Study **4 QH**
Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq. Permission of instructor. Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving **4 QH**
Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific real-world models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq. Permission of instructor.*

MTH 1810 Directed Study **1 QH**
Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq. Permission of instructor.*

MTH 1811 Directed Study **2 QH**
Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq. Permission of instructor.*

MTH 1825, MTH 1826, MTH 1827, MTH 1828 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

MTH 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses, see page 34. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNC 1553 Chinese Film: Gender, Ethnicity, and Urbanity
LNF 1521 French Film and Culture
LNF 1550 Introductory Film Analysis
LNF 1551 Film Theory
LNF 1557 Modernism: Art, Film, and Literature
LNF 1560 Film and Psychoanalysis
LNG 1554 Modern German Film and Literature
LNR 1550 History of Soviet Cinema
LNS 1550 Spanish Civil War in Spanish Film

Linguistics

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses, see page 64. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1250 History of the French Language
LNL 1235 Applied Linguistics
LNL 1260 Introduction to Romance Linguistics
LNS 1250 History of the Spanish Language

Literature and Culture (taught in English)

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNC 1503 Backgrounds of Chinese Culture
LNC 1553 Chinese Film: Gender, Ethnicity, and Urbanity
LNF 1510 Modern Philosophical French Literature in Translation
LNF 1512 Introduction to Literature
LNI 1510 The Works of Dante in Translation 1
LNI 1511 The Works of Dante in Translation 2
LNI 1512 Italian Seminar: Pirandello
LNR 1500 Backgrounds in Russian Culture
LNR 1510 The Works of Alexander Pushkin in Translation
LNR 1511 Russian Literature in Translation
LNR 1550 History of Soviet Cinema
LNS 1500 Backgrounds in Hispanic Culture
LNS 1501 Backgrounds of Latin American Culture
LNS 1506 Cervantes and His Times
LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance
LNS 1511 Introduction to Caribbean Literature
LNS 1512 The Don Juan Figure in Literature

Chinese

LNC 1101 Elementary Chinese 1 **4 QH**
Designed to acquaint the student with features of spoken and written Mandarin Chinese. Stresses grammar, oral performance, and simple characters. Students who wish to speak another dialect of Chinese should consult instructor for proper placement.

LNC 1102 Elementary Chinese 2 **4 QH**
Continues LNC 1101. Studies grammar and spoken and written forms of the language. *Prereq. LNC 1101.*

LNC 1103 Intermediate Chinese 1 **4 QH**
Continues LNC 1102. Covers more advanced features of the language as well as continued study of characters. *Prereq. LNC 1102.*

LNC 1104 Intermediate Chinese 2 **4 QH**
Continues LNC 1103. Offers more advanced work in grammar, conversation, and characters. *Prereq. LNC 1103.*

LNC 1201 Chinese Composition and Conversation **4 QH**
Allows students to engage actively in communication within various contexts and reviews the more subtle problems of grammar and writing style. This communicative class is for intermediate or advanced learners. It is especially suitable for Asian-American students who have knowledge of certain Chinese dialects (e.g., Cantonese and a level of language competence equal to four quarters in the college Chinese program) and want to learn Mandarin Chinese through reading, writing, and discussion. *Prereq. LNC 1104 or instructor's permission.*

LNC 1801 Directed Study in Chinese **4 QH**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. *Priority given to language majors and to juniors and seniors.*

French

LNF 1101 Elementary French 1 **4 QH**
Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2 **4 QH**
Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq. LNF 1101.*

LNF 1103 Intermediate French 1 **4 QH**
Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq. LNF 1102 or equivalent.*

LNF 1104 Intermediate French 2 **4 QH**
Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq. LNF 1103.*

LNF 1107 Reading French in the Arts and Sciences **4 QH**
Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. *Not a substitute for LNF 1103 or LNF 1104.*

LNF 1111 Elementary French for Business **4 QH**
Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. *LNF 1102 may be taken as a sequel to LNF 1111.*

LNF 1140 Intensive Intermediate French **8 QH**
Continues study of French to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced French courses. *Prereq. LNF 1102.*

LNF 1201 Intensive Review of French **4 QH**
Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, comprehension, and reading and speaking skills. Required of all French majors, it serves as prerequisite for all other French courses at the 1200 level. Conducted largely in French. Non-majors are invited as well, as this course is an excellent way to review previous French study.

LNF 1202 Advanced French Proficiency 1 **4 QH**
Focuses on the students' particular grammar needs as well as the nuances of the language. Designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French. *Prereq. LNF 1201 or equivalent.*

LNF 1203 Advanced French Proficiency 2 **4 QH**
Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken and written French and the study of idioms. *Prereq. LNF 1202 or equivalent.*

LNF 1204 Advanced French Proficiency 3 **4 QH**
Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq. LNF 1203 or equivalent.*

LNF 1225 Introduction to the French-Speaking World **4 QH**
Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and "pop" aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq. LNF 1104 or equivalent.*

LNF 1231 Masterpieces of French Literature 1 **4 QH**
Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western and Francophone culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (Core Category II) *Prereq. LNF 1201 or equivalent.*

LNF 1232 Masterpieces of French Literature 2 **4 QH**
Continues LNF 1231, which is not a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings may include an "existential" play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (Core Category II) *Prereq. LNF 1201 or equivalent.*

LNF 1250/LIN 1245 History of the French Language **4 QH**
Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq. Reading knowledge of French or permission of instructor.*

LNF 1305 French Literature in the Seventeenth Century **4 QH**
Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the table, the novel, and epistolary writing. Among the authors treated are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sevigne, and Mme. de La Fayette. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1306 French Theatre in the Seventeenth Century **4 QH**
Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Moliere. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1307 French Literature in the Eighteenth Century 1 **4 QH**
Studies the eighteenth century in France, known as the Age of Enlightenment. It was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prévost, and Voltaire. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1308 French Literature in the Eighteenth Century 2 **4 QH**
Focuses on the latter half of the century when we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Lacios, and Beaumarchais. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1309 French Literature of the Nineteenth Century 1 **4 QH**
Treats romanticism as a major cultural phenomenon. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1310 French Literature of the Nineteenth Century 2 **4 QH**
Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the style of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in Les Fleurs du Mal, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1311 French Literature of the Twentieth Century 1 **4 QH**
Offers a study of the major movements in the narrative and dramatic prose writers up to 1950, including Proust, A. France, Colette, Anouilh, and Camus. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1312 French Literature of the Twentieth Century 2 **4 QH**
Continues the study of the 20th century French literature, with an emphasis on the literary journal from Gide to J. Green. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports in French. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1315 French Poetry, Past and Present **4 QH**
Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1405 Topics in French **4 QH**
Provides an in-depth study of specific structural aspects of the French language. Subjects will vary from year to year. *Prereq. LNF 1102 or equivalent.*

LNF 1510 Modern Philosophical French Literature in Translation **4 QH**
Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1512 Introduction to Literature **4 QH**
Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1521 French Film and Culture **4 QH**
Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (Core Category IV)

LNF 1550 Introductory Film Analysis **4 QH**
Provides a basic introduction to film art and compares and contrasts three styles of filmmaking: expressionism, surrealism, and realism as they have been used in Hollywood cinema and the European art cinema. May be taken for French or German credit with permission of the instructor.

LNF 1551 Film Theory **4 QH**
Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (Core Category V)

LNF 1557 Modernism: Art, Film, and Literature **4 QH**
Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies futurism, cubism, expressionism, dada, and surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film.

LNF 1560 Film and Psychoanalysis **4 QH**
Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes, especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

LNF 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

German

LNG 1101 Elementary German 1 **4 QH**
Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 **4 QH**
Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq. LNG 1101 or equivalent.*

LNG 1103 Intermediate German 1 **4 QH**
Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq. LNG 1102 or equivalent.*

LNG 1104 Intermediate German 2 **4 QH**
Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Durrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq. LNG 1103 or equivalent.*

LNG 1107 Reading German **4 QH**
Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German 1 **4 QH**
Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1140 Intensive Intermediate German **8 QH**
Continues study of German to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced German courses. *Prereq. LNG 1102.*

LNG 1201 German Composition and Conversation 1 **4 QH**
Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq. LNG 1104 or equivalent.*

LNG 1202 German Composition and Conversation 2 **4 QH**
Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq. LNG 1201 or equivalent.*

LNG 1231 Masterpieces of German Literature 1 **4 QH**
Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Durrenmatt, and Böll. Works read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is expected. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq. LNG 1104 or equivalent.*

LNG 1232 Masterpieces of German Literature 2 **4 QH**
Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq. LNG 1104 or equivalent.*

LNG 1309 German Literature of the Nineteenth Century **4 QH**
Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso, Klelst, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq. LNG 1232 or equivalent.*

LNG 1311 German Literature of the Twentieth Century **4 QH**
Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq. LNG 1232 or equivalent.*

LNG 1405 Topics in German **4 QH**
Provides an in-depth study of specific structural aspects of the German language. Subjects will vary from year to year. *Prereq. LNG 1102 or equivalent.*

LNG 1554 Modern German Film and Literature **4 QH**
Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the postwar era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Böll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers—Fassbinder, Schlondorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (Core Category IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

Italian

LNI 1101 Elementary Italian 1 **4 QH**
Offers the beginner who wants instruction in the essentials of Italian grammar and opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2 **4 QH**
Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq. LNI 1101 or equivalent.*

LNI 1103 Intermediate Italian 1 **4 QH**
Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq. LNI 1102 or equivalent.*

LNI 1104 Intermediate Italian 2 **4 QH**
Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq. LNI 1103 or equivalent.*

LNI 1201 Italian Composition and Conversation 1 **4 QH**
Aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. For students who have mastered the fundamentals of the language. There will be no study of grammar as such. Conducted entirely in Italian. *Prereq. LNI 1104 or equivalent.*

LNI 1202 Italian Composition and Conversation 2 **4 QH**
Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq. LNI 1201 or equivalent.*

LNI 1311 Italian Literature of the Twentieth Century 1 **4 QH**
Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq. LNI 1232 or equivalent.*

LNI 1312 Italian Literature of the Twentieth Century 2 **4 QH**
Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq. LNI 1232 or equivalent.*

LNI 1510 The Works of Dante in Translation 1 **4 QH**
Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Conducted in English. (Core Category III)

LNI 1511 The Works of Dante in Translation 2 **4 QH**
Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello **4 QH**
Examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

Linguistics

LNL 1220/LIN 1220 Introduction to Phonetics and Phonology **4 QH**
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LNL 1235/LIN 1235 Applied Linguistics **4 QH**
Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics, but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LNL 1240/LIN 1240 Bilingualism **4 QH**
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LNL 1260/LIN 1260 Introduction to Romance Linguistics **4 QH**
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronouns use. Conducted in English. *Prereq. Reading knowledge of one Romance language or permission of instructor.*

Russian

LNR 1101 Elementary Russian 1 **4 QH**
Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 **4 QH**
Continues grammar study; oral and written exercises. *Prereq. LNR 1101.*

LNR 1103 Intermediate Russian 1 **4 QH**
Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq. LNR 1102.*

LNR 1104 Intermediate Russian 2 **4 QH**
Continues LNR 1103. *Prereq. LNR 1103.*

LNR 1201 Russian Composition and Conversation 1 **4 QH**
Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq. LNR 1104 or equivalent.*

LNR 1202 Russian Composition and Conversation 2 **4 QH**
Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq. LNR 1201 or equivalent.*

LNR 1205 Stylistics and Advanced Grammar Analysis 1 **4 QH**
Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq. LNR 1104 or permission of instructor.*

LNR 1309 Russian Short Stories of the Nineteenth Century **4 QH**
Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq. LNR 1104 or equivalent.*

LNR 1315 Russian Expository Prose **4 QH**
Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq. LNR 1104.*

LNR 1316 Russian Folklore **4 QH**
Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq. LNR 1104.*

LNR 1500 Backgrounds in Russian Culture **4 QH**
Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in English Translation **4 QH**
Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences. Conducted in English.

LNR 1511 Russian Literature in English Translation **4 QH**
A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others. Conducted in English.

LNR 1550 History of Soviet Cinema **4 QH**
Surveys the emergence and development of the film industry in the USSR. Examines the political, economic, ideological, and artistic sources of Soviet cinema and their relationship to Russian culture and history. Directors considered include Eisenstein, Vertov, Pudovkin, Dovzhenko, Kozintsev, and Kalatozov. (Core Category IV)

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 **4 QH each**
Directed Study
Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 **4 QH**
Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 **4 QH**
Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq. LNS 1101 or equivalent.*

LNS 1103 Intermediate Spanish 1 **4 QH**
Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq. LNS 1102 or equivalent.*

LNS 1104 Intermediate Spanish 2 **4 QH**
Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq. LNS 1103 or equivalent.*

LNS 1105 Conversational Spanish 1 **4 QH**
Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq. LNS 1104 or equivalent; open to nonmajors only.*

LNS 1106 Conversational Spanish 2 **4 QH**
Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq. LNS 1105 or equivalent; open to nonmajors only.*

LNS 1130 Intensive Spanish **8 QH**
Encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1140 Intensive Intermediate Spanish **8 QH**
Continues study of Spanish to further audio-lingual skills and improves reading and writing. Seeks to prepare students for advanced Spanish courses. *Prereq. LNS 1102.*

LNS 1201 Spanish Composition and Conversation 1 **4 QH**
Offers practice in writing and speaking Spanish, including written and oral résumés, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 **4 QH**
Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq. LNS 1201 or equivalent.*

LNS 1203 Advanced Spanish Proficiency 1 **4 QH**
Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. Designed for those preparing to enter the teaching profession as well as qualified advanced students. *Prereq. Permission of instructor.*

LNS 1204 Advanced Spanish Proficiency 2 **4 QH**
Continues the aims and goals of LNS 1203. *Prereq. LNS 1203 and permission of instructor.*

LNS 1231 Masterpieces of Spanish Literature 1 **4 QH**
Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (Core Category II) *Prereq. LNS 1104 or equivalent.*

LNS 1232 Masterpieces of Spanish Literature 2 **4 QH**
Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the Generation of '98. Conducted in Spanish. (Core Category II) *Prereq. LNS 1104 or equivalent.*

LNS 1250 History of the Spanish Language **4 QH**
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LNS 1301 Spanish Medieval Literature **4 QH**
Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines non-literary texts such as wills and laws for their historical and literary relevance.

LNS 1306 Spanish Golden Age Theatre **4 QH**
Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1309 Spanish Literature of the Nineteenth Century 1 **4 QH**
Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1310 Spanish Literature of the Nineteenth Century 2 **4 QH**
Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1311 Spanish Literature of the Twentieth Century 1 **4 QH**
Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq. LNS 1232 or equivalent.*

LNS 1312 Spanish Literature of the Twentieth Century 2 **4 QH**
Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayla, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq. LNS 1232 or equivalent.*

LNS 1315 Latin American Literature 1 **4 QH**
Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Díaz, Sor Juana, Jorge Isaacs and José Hernández. *Prereq. LNS 1204 or equivalent.*

LNS 1316 Latin American Literature 2 **4 QH**
Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos, and Vargas Llosa. *Prereq. LNS 1204 or equivalent.*

LNS 1400 Spanish Seminar **4 QH**
Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.

LNS 1401 Seminar in Spanish Literature **4 QH**
Focuses on a selected group of Galdos's novels through detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; nonmajors who show exceptional background in Spanish may be admitted. *Prereq. Permission of instructor.*

LNS 1402 Seminar in the Contemporary Spanish Theatre **4 QH**
Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq. LNS 1232 or permission of instructor.*

LNS 1405 Topics in Spanish **4 QH**
Provides an in-depth study of specific structural aspects of the Spanish language. Subjects will vary from year to year. *Prereq. LNS 1102 or equivalent.*

LNS 1500 Backgrounds of Spanish Culture **4 QH**
Examines chronologically the forces that have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (Core Category IV)

LNS 1501 Backgrounds of Latin American Culture **4 QH**
Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (Core Category IV)

LNS 1505 Cervantes and His Times **4 QH**
Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Interludes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (Core Category III)

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance **4 QH**
Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature **4 QH**
Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature **4 QH**
Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (Core Category III)

LNS 1550 Spanish Civil War in Spanish Film **4 QH**
Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936–1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (Core Category III)

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805 Directed Study **4 QH each**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

LNS 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Music

MUS 1100 Introduction to Music **4 QH**
Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (Core Category II)

MUS 1101 Music: A Listening Experience **4 QH**
Offers a self-paced, computer-mediated, Internet-communicated introduction to music course. Students learn how to listen to classical music. No previous musical knowledge is required or assumed. Draws all musical examples from the masterworks of Western classical music. No classes are scheduled for this course and all learning takes place at a computer, either in one of the on-campus computer labs or at any other location. For more information see this course's home page at: http://multimedia.dac.neu.edu/aom/ (Core Category II)

MUS 1103 Music as a Social Expression **4 QH**
Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (Core Category III)

MUS 1104/AFR 1153 Survey of African-American Musics **4 QH**
Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles.

MUS 1105 Music of the U.S.A. **4 QH**
Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (Core Category V)

MUS 1106 Women, Gender, and Music **4 QH**
Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger. (Core Category VI)

MUS 1107 Principles of Music Literature **4 QH**
Examines the evolution and application of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. *Prereq. Music majors only or permission of instructor.*

MUS 1109 Introduction to Art, Drama, and Music **4 QH**
Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (Core Category II)

MUS 1110 Music in Popular Culture **4 QH**
Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music **4 QH**
Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112/AFR 1451 Jazz **4 QH**
Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the sociocultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History **4 QH**
Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (Core Category III) *Prereq. MUS 1201.*

MUS 1121 Medieval and Renaissance Music **4 QH**
Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era **4 QH**
Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era **4 QH**
Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven.

MUS 1124 Music of the Romantic Era **4 QH**
Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (Core Category V)

MUS 1125 Twentieth-Century Music **4 QH**
Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (Core Category V)

MUS 1126 New Directions in Music **4 QH**
Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony **4 QH**
Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers **4 QH**
Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera **4 QH**
Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature **4 QH**
Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry **4 QH**
Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (Core Category III)

MUS 1139 Film Music **4 QH**
Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart **4 QH**
Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1144 Debussy and the Music of Paris **4 QH**
Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.

MUS 1145 Beethoven **4 QH**
Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (Core Category III)

MUS 1146 George Gershwin **4 QH**
Studies the life and works of George Gershwin (1898–1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy 1 **4 QH**
Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2 **4 QH**
Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq. MUS 1161.*

MUS 1163 Sound Health **4 QH**
Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry 1 **4 QH**
Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class. *Prereq. Music majors only or permission of instructor.*

MUS 1166 The Music Industry 2 **4 QH**
Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, music merchandising, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq. MUS 1165. Music majors only or permission of instructor.*

MUS 1167 Music Administration **4 QH**
Introduces music management, including the structure of non-profit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq. MUS 1166 or permission of instructor.*

MUS 1170 Music and Technology **4 QH**
Studies the applications of contemporary computing technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers. *For non-music majors.*

MUS 1171 Computer Literacy for Musicians **4 QH**
Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum. *Prereq. Music majors only.*

MUS 1172 Introduction to Music Recording **4 QH**
Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation. *Prereq. Music majors only or permission of instructor.*

MUS 1173 Music Recording 2 **4 QH**
Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq. MUS 1172. Music majors only or permission of instructor.*

MUS 1174 Music Production for Radio **4 QH**
Introduces the core skills required for production of music programs for radio. Instructs students in technical, contextual, and compositional aspects of music production including transmission chains and signal processing, audience targeting using Modal techniques and music demographics analysis, selecting talent, and structuring a program clock. *This course is open to music industry majors and music industry minors.*

MUS 1175 Music and Technology 2 **4 QH**
Continues MUS 1170 and MUS 1171. Presents advanced topics related to music composition with computers. Emphasizes the completion of original music works that employ various methods of sound synthesis, such as additive synthesis, frequency modulation, subtractive synthesis, physical modeling, resynthesis, and MIDI. Students will use both hardware and software production tools for the completion of these works. *Prereq. MUS 1170 or MUS 1171 or permission of instructor.*

MUS 1180 Introduction to World Music **4 QH**
Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181/AFR 1156 Music of Africa **4 QH**
Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African musics, instruments, and performance traditions.

MUS 1182 Music of the Middle East **4 QH**
Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia **4 QH**
Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills. (Core Category IV)

MUS 1184 Musics of South America, Latin America, and the Caribbean **4 QH**
Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertories, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism. (Core Category IV)

MUS 1185 The Music of the Jewish People **4 QH**
Investigates the role that music has played in Jewish life from ancient to modern times. Topics to be studied include: music in the time of *The Bible*, Rabbinic attitudes toward music, music and mysticism, the development of the modes for prayer and scriptural cantillation, church and synagogue music compared, music of the holidays and the life cycle, folk and popular music in the diaspora, the development of art music in the modern era, and music in modern Israel. (Core Category IV) *Prior knowledge of music is not required.*

MUS 1200 Fundamentals of Music **4 QH**
Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms.

MUS 1201 Music Theory 1 **4 QH**
Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. *Prereq. MUS 1200 or permission of instructor.*

MUS 1202 Music Theory 2 **4 QH**
Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. *Prereq. MUS 1201 or permission of instructor.*

MUS 1203 Music Theory 3 **4 QH**
Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. *Prereq. MUS 1202 or permission of instructor.*

MUS 1204 Music Theory 4 **4 QH**
Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. *Prereq. MUS 1203 or permission of instructor.*

MUS 1209 Functional Piano **4 QH**
Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq. MUS 1202.*

MUS 1210 Music Theory Lab **1 QH**
Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing **4 QH**
Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq. MUS 1201 or equivalent.*

MUS 1230 Chorus **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1231 Band **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1232 Chamber Ensembles and Orchestra **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1233 Early Music Players **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1234/AFR 1234 Jazz Ensemble **1 QH**
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American musics. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

MUS 1241 Piano Class 1 **4 QH**
Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2 **4 QH**
Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq. MUS 1241.*

MUS 1244 Voice Class 1 **4 QH**
Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq. Permission of instructor.*

MUS 1247 Guitar Class 1 **4 QH**
Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting **4 QH**
Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq. Ability to read music and to sing or play an instrument.*

MUS 1261, MUS 1262 Music Lessons 1 and 2 **1 QH each**
Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee. *Prereq. Music majors only and permission of instructor.*

MUS 1265/AFR 1233 Jazz Improvisation 1 **4 QH**
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1 **4 QH**
Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq. MUS 1204.*

MUS 1302 Form and Analysis 2 **4 QH**
Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq. MUS 1301.*

MUS 1360 Artist Management **4 QH**
Provides an in-depth investigation of the field of musical artist management. Explores the artist-manager relationship, the management contract, artist evaluation, image formulation, the artist's development team, achieving a recording contract, merchandising, endorsements, sponsorships, touring, and financial management. *Prereq. MUS 1166 or permission of instructor.*

MUS 1361 The Record Industry **4 QH**
Examines the domestic and international record industry. Topics include industry structure, business and legal affairs, the recording contract, royalties, manufacturing, distribution, promotion, publicity, advertising, licensing, and piracy. Offers students the opportunity to explore major record labels and independent labels. Addresses the past, present, and future. *Prereq. MUS 1166.*

MUS 1362 Music Merchandising **4 QH**
Provides a thorough examination of business organization, marketing, distribution, and sales techniques in the diverse field of music merchandising. Investigates market sectors such as musical instruments; professional, semiprofessional, and home audio equipment; the recording industry; and print music. Presents guest speakers from various sectors of the music industry. *Prereq. MUS 1166 or permission of instructor.*

MUS 1365 Seminar in the Music Industry **4 QH**
A capstone course for music industry students. Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to reflect upon, distill, and apply knowledge accumulated in prior courses and previous experiential learning. This reflection and application will occur through substantial writing assignments and classroom discussion. *Fulfills the college's experiential education requirement for music majors whose concentration is music industry. Prereq. MUS 1166 and senior standing.*

MUS 1366 Copyright Law for Musicians **4 QH**
Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. *Prereq. MUS 1166 or permission of instructor.*

MUS 1367 Computer Applications in Music Business **4 QH**
Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq. MUS 1166.*

MUS 1370 Seminar in Performance Practice **4 QH**
Provides students with the opportunity to reflect on their research as it applies to their performances. Students will be expected to present written reports to be discussed at the seminar. Students will also be asked to research and write the program notes for their performances. *Fulfills the college's experiential education requirement for literature and performance majors. Prereq. MUS 1203, MUS 1241, MUS 1421, and one of the following: MUS 1422, MUS 1423, and MUS 1424.*

MUS 1421 Historical Traditions 1: American Music **4 QH**
Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical music. *Prereq. MUS 1107.*

MUS 1422 Historical Traditions 2 **4 QH**
Provides an overview of early Western music, from the middle ages through the seventeenth century in cultural and stylistic contexts. Concentrates on classical music but will also deal with music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1423 Historical Traditions 3 **4 QH**
Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1424 Historical Traditions 4 **4 QH**
Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular music as well. *Prereq. MUS 1421.*

MUS 1425 Historical Traditions 5 **4 QH**
Examines the historical musical traditions of selected music-cultures of Africa, Asia, Oceania, and indigenous cultures of the Americas. Provides an in-depth study of the evolution of the selected music-cultures focusing on the following considerations: ethnomusicological historical approaches to the study of music-cultures including music and the belief system, aesthetics, context for music, repertoires, organization of musical sound, instruments and performance techniques, and learning and transmission of musical knowledge (performance and non-performance). Explores why music is different among the world's peoples; what music of the past sounded like, its impact on how music sounds today; what happens to music over time and space; and why music should be preserved and by whom. *Prereq. MUS 1421.*

MUS 1461 Applied Music Lessons **3 QH**
Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq. Permission of instructor and department chair.*

MUS 1700 Introduction to Music (Honors) **4 QH**
Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) **4 QH**
Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study **4 QH each**
Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

MUS 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Courses at the New England Conservatory
Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion

PHL 1100 Introduction to Philosophy **4 QH**
Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (Core Category II)

PHL 1110 Introduction to Religion **4 QH**
Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a different way, and how that leads to distinctive ways of life. (Core Category II)

PHL 1130 Ethics: East and West **4 QH**
Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (Core Category V)

PHL 1135 Philosophical Problems of Law and Justice **4 QH**
Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question, deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (Core Category VI)

PHL 1140 Social and Political Philosophy **4 QH**
Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (Core Category V) *Prereq. 4 QH philosophy.*

PHL 1160 Philosophical Problems of Economic Justice **4 QH**
Focuses on the questions: What is economic justice? And, What features must a society have in order to be economically just? Readings include classical and contemporary works by philosophers and other thinkers. Analyzes and evaluates economic systems such as capitalism, socialism, and the welfare state.

PHL 1165 Moral Problems in Medicine **4 QH**
Introduces students to ethical theories, moral principles, and principles of distributive justice. Uses these theories and principles to analyze the moral problems that arise in the medical context. Topics considered are: euthanasia, medical paternalism, informed consent, patient confidentiality, the duty to warn, the right to die and advanced directives, the ethics of medical research, abortion, and human genetics. Also examines the right to health care, distribution of scarce medical resources, and the ethical implications of health maintenance organizations.

PHL 1170 Business Ethics **4 QH**
Examines ethical principles and considerations involved in making moral business decisions. Studies the foundation of basic ethical viewpoints and analyzes specific characteristics of business life through case studies and examples. Includes issues such as corporate responsibility, employee rights, conflict of interest and roles, advertising and information disclosure, environmental issues, and self- and governmental regulation.

PHL 1180 Environmental Ethics **4 QH**
Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (Core Category VI)

PHL 1200 Introduction to Logic 1* **4 QH**
Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (Core Category II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2* **4 QH**
Continues the study of the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (Core Category II)

PHL 1215/LIN 1215 Symbolic Logic* **4 QH**
Focuses on the syntax and semantics of propositional logic and first-order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (Core Category II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy **4 QH**
Examines the philosophy of classical Greece. Considers philosophers with distinctive views of the nature of the material world and of the person, so the course covers both metaphysical and moral writings. Texts are primarily from Socrates, Plato, and Aristotle. Also gives some consideration to early Greek philosophers, to the Sophists, and to later developments. (Core Category III)

PHL 1230 Modern Philosophy **4 QH**
Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (Core Category III) *Prereq. 8 QH philosophy.*

PHL 1243 Existentialism **4 QH**
Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq. 4 QH philosophy.*

PHL 1245 Analytic Philosophy **4 QH**
Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq. 8 QH philosophy.*

PHL 1250 Chinese Religion **4 QH**
Offers a study of Chinese philosophy in the ancient period (until 221 B.C.E.). Emphasizes Confucianism, Taoism, and the I Ching. Covers the Logicians, the Mohists, and the Legalists.

PHL 1265 Latin American Religions **4 QH**
Explores the major religious traditions of Latin America—indigenous, Christian, and African—and how they have influenced each other, resulting in the syncretisms and religious cultures of our own day. Uses historical texts, narrative, art, interpretive essays, and music to look at the dynamics of that interplay, exploring in particular the factors that have shaped what was introduced, accepted, rejected, and retained. (Core Category III)

PHL 1275 Eastern Religions **4 QH**
Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Hahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (Core Category IV)

PHL 1280 Islam **4 QH**
Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (Core Category IV)

PHL 1285 Introduction to Jewish Religion and Culture **4 QH**
Explores the basic features of Judaism in the ancient, Rabbinic and Modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.

PHL 1290 Cults and Sects **4 QH**
Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions. (Core Category V)

*Students should take either PHL 1200 and PHL 1203 *or* PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1293 Eastern and Nontraditional Philosophy **4 QH**
Offers a multicultural look, using primary sources, at the diverse perspectives available to address philosophical issues. Perspectives include African, Asian, Latin American, feminist, womanist, Amerindian, and African-American views. Includes such topics as self-identity, reality, truth, knowledge, ethics, social and political arrangements, and perceptions of divinity.

PHL 1315 Understanding the Bible **4 QH**
Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (Core Category III)

PHL 1316 Interpreting the Bible **4 QH**
Offers students the opportunity to understand the Bible as a document that is continually interpreted by believing communities in their own social and religious contexts. Studies various interpretations of such passages as the creation story, resurrection accounts, themes in Revelation, and the Exodus event. *Prereq. PHL 1315.*

PHL 1320 The Meaning of Death **4 QH**
Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (Core Category V)

PHL 1325 The Holocaust: Responses to Mass Death **4 QH**
Explores the variety of responses to the mass death brought on by the Holocaust. Uses the five stages of dying that Elizabeth Kubler-Ross outlines both to examine the reactions of Holocaust victims to imminent death and to understand the way in which survivors attempted to cope with bereavement. Examines the responses of theology literature as well as relevant ethical issues.

PHL 1335 Moral Philosophy **4 QH**
Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq. 4 QH philosophy or religion or permission of instructor.* (Core Category V)

PHL 1340 Aesthetics **4 QH**
Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq. 4 QH philosophy.*

PHL 1345 Philosophy of Religion **4 QH**
Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq. 4 QH philosophy.*

PHL 1350 Philosophy of Human Nature **4 QH**
Considers various attributes of human beings such as intelligence, sexuality, and language in the context of biological, psychological, linguistic, and philosophical views of human nature. Topics and disciplines will change from year to year. (Core Category V)

PHL 1360 Philosophy and Literature **4 QH**
Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors.

PHL 1370 The Meaning of Life **4 QH**
Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1400 Theory of Knowledge **4 QH**
Focuses on questions about the nature and justification of claims to knowledge. Is there genuine knowledge? How do we tell when a belief or theory is sufficiently justified to count as knowledge? Discusses theories such as various forms of rationalism, empiricism, and skepticism. Requires careful reading of works by such influential thinkers as René Descartes, Bertrand Russell, A.J. Ayer, and T.S. Kuhn. *Prereq. 16 QH philosophy.*

PHL 1405 Metaphysics **4 QH**
Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq. 8 QH philosophy.*

PHL 1410 Philosophy of Science **4 QH**
Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq. 4 QH philosophy.*

PHL 1415 Advanced Logic **4 QH**
Studies the major results in the meta-theory of first-order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq. PHL 1215.*

PHL 1435 Philosophy of Mind **4 QH**
Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge

and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq. 4 QH philosophy.*

PHL 1440/LIN 1440 Philosophy of Language **4 QH**
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor. *Prereq. Permission of instructor.*

PHL 1550, PHL 1551, PHL 1552, PHL 1553 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

PHL 1700 Introduction to Philosophy (Honors) **4 QH**
Honors equivalent of PHL 1100.

PHL 1720 The Meaning of Death **4 QH**
Honors equivalent of PHL 1320.

PHL 1740 Social and Political Philosophy (Honors) **4 QH**
Honors equivalent of PHL 1140.

PHL 1800 Directed Study **4 QH**
Those interested in the directed study program should meet with the department chair. *Prereq. permission of instructor.*

PHL 1801 Research Internship **4 QH**
Seeks to familiarize students with at least one of the three stages of an advanced research project: 1) securing research funds, 2) substantive research and research techniques, and 3) publication and presentation of research results. Students may opt to take this practicum in conjunction with a writing project of their own. In addition to helping students develop additional knowledge of the research resources that are available, this course is intended to develop their critical skills. *Fulfills the College of Arts and Sciences experiential education requirement for philosophy majors. Prereq. Permission of supervising instructor and 24 QH of PHL courses.*

PHL 1802 Teaching Internship **4 QH**
Centers around two issues central to the pedagogical enterprise; namely, course design and implementation. Involves discussions with the supervisor, observation of teaching techniques, test development, discussion leading, and lecture presentation. Students will work with the instructor in one course, assist in syllabus development, observe and lead several discussions, and present a lecture or lectures on one topic to be determined during the syllabus development. *Fulfills the College of Arts and Sciences experiential education requirement for philosophy majors. Prereq. Permission of supervising instructor and 24 QH of PHL courses.*

PHL 1881 Great Philosophers Seminar **4 QH**
Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq. 12 QH of philosophy courses.*

PHL 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

PHL 1890 Seminar in Religion **4 QH**
Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq. 12 QH of philosophy and religion courses.*

PHL 1891 Major Figures in Religious Studies **4 QH**
Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq. 12 QH of religious studies.*

PHL 3265 Issues in Medical Ethics **4 QH**
Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq. Permission of instructor.*

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy 1 **4 QH**
Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (Core Category II)

PHY 1121 Introduction to Science 1 **4 QH**
Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (Core Category II)

PHY 1132 Energy and the Environment **4 QH**
Presents concepts of physics applied to current problems of the physical environment. Topics include sources of energy (fossil fuels, nuclear, and solar); energy storage and conservation; transportation; and pollution of the atmosphere. No previous knowledge of physics is assumed. (Core Category VI)

Introductory Physics Courses

PHY 1191 Physics for BSET 1 **4 QH**
Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq. MTH 1191, which may be taken concurrently; BSET majors only.*

PHY 1192 Physics for BSET 2 **4 QH**
Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq. PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.*

PHY 1193 Physics for BSET 3 **4 QH**
Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq. PHY 1192; BSET majors only.*

PHY 1201 Physics for the Life Sciences 1 **4 QH**
Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (Core Category II)

PHY 1202 Physics for the Life Sciences 2 **4 QH**
Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (Core Category II) *Prereq. PHY 1201.*

PHY 1203 Physics for the Life Sciences 3 **4 QH**
Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq. PHY 1202.*

PHY 1221 Physics for Science and Engineering Students 1 **4 QH**
The first quarter of a four-quarter sequence intended primarily for science and engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions, and rotations. *Prereq. MTH 1123 or equivalent, which may be taken concurrently.*

PHY 1222 Physics for Science and Engineering Students 2 **4 QH**
Continues PHY 1221. Focuses on rotation equilibrium, angular momentum, harmonic motion, fluid mechanics, wave motion, sound, and optics. *Prereq. PHY 1221 and MTH 1124 or equivalent, which may be taken concurrently.*

PHY 1223 Physics for Science and Engineering Students 3 **4 QH**
Focuses on electricity, electric fields, electric potential, Ohm's law, simple circuits, magnetic fields, Faraday's law and induction, and Maxwell's equations. *Prereq. PHY 1222 and MTH 1125 or equivalent, which may be taken concurrently.*

PHY 1224 Physics for Science and Engineering Students 4 **4 QH**
Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schroedinger equation, wave functions, the hydrogen atom, solids, nuclear and atomic physics). *Prereq. PHY 1221, PHY 1222, and PHY 1223 or equivalent.*

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1 **1 QH**
Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq. PHY 1191 concurrently; BSET majors only.*

PHY 1197 Physics BSET Laboratory 2 **1 QH**
Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq. PHY 1196; PHY 1192 concurrently; BSET majors only.*

PHY 1198 Physics BSET Laboratory 3 **1 QH**
Covers experiments from PHY 1193. Lab fee. *Prereq. PHY 1193 concurrently; BSET majors only.*

PHY 1501 Physics Laboratory for the Life Sciences 1 **1 QH**
Accompanies PHY 1201. *Prereq. PHY 1201 concurrently.*

PHY 1502 Physics Laboratory for the Life Sciences 2 **1 QH**
Accompanies PHY 1202. *Prereq. PHY 1501; PHY 1202 or PHY 1203 concurrently.*

PHY 1521 Physics Laboratory for Science and Engineering Students 1 **1 QH**
The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. *PHY 1221 concurrently.*

PHY 1522 Physics Laboratory for Science and Engineering Students 2 **1 QH**
Continues PHY 1521. *Prereq. PHY 1521; PHY 1222 concurrently.*

PHY 1533 Physics Laboratory for Science Majors 3 **1 QH**
Focuses on lab experiments related to topics covered in PHY 1233. *Prereq. PHY 1522; PHY 1223 concurrently.*

Advanced Physics and Astronomy Courses

PHY 1300 Physics with Computers **4 QH**
Introduces using computer software to solve scientific problems. Uses spreadsheet programs and MATLAB to discuss examples such as motion damped by friction, resonance phenomena, simulation of exponential decay processes, period doubling, and chaos. *Prereq. PHY 1223 or equivalent, or permission of instructor.*

PHY 1302 Electric and Magnetic Fields **4 QH**
Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form.

PHY 1303 Modern Physics **4 QH**
Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. Introduces the special theory of relativity. *Prereq. PHY 1223 or equivalent.*

PHY 1304 Mathematical Physics **4 QH**
Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq. MTH 1244 and PHY 1233; MTH 1246 concurrently.*

PHY 1305 Thermodynamics and Kinetic Theory **4 QH**
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq. PHY 1224 or PHY 1233, and MTH 1244.*

PHY 1401 Classical Mechanics **4 QH**
Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq. PHY 1301 and MTH 1245.*

PHY 1402 Electricity and Magnetism 1 **4 QH**
Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq. PHY 1302 and PHY 1304 or equivalent.*

PHY 1403 Electricity and Magnetism 2 **4 QH**
Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq. PHY 1402 or equivalent.*

PHY 1404 Wave Motion and Optics **4 QH**
Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq. PHY 1302.*

PHY 1411 Introduction to Astrophysics and Cosmology **4 QH**
Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectroscopes, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq. Three quarters of elementary physics.*

PHY 1413 Introduction to Nuclear Physics **4 QH**
Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq. PHY 1303.*

PHY 1414 Introduction to Solid State Physics **4 QH**
Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq. CHM 1383 or PHY 1303; and PHY 1305 or equivalent.*

PHY 1415 Quantum Mechanics 1 **4 QH**
Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq. CHM 1383 or PHY 1303; and PHY 1304 or equivalent.*

PHY 1416 Quantum Mechanics 2 **4 QH**
Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq. PHY 1415.*

PHY 1421 Biological Physics 1 **4 QH**
Examines the physical principles of bioelectricity. Covers the anatomical and physiological basis of signal propagation in nerve and muscle cells, the active properties of cell membranes, electrophysiological models of charge and ion transport across membranes, action potential propagation in excitable tissues, the behavior of bioelectric and biomagnetic fields in and around the volume conductors formed by the body, and the theoretical foundations of electrocardiology and electroencephalography. *Prereq. PHY 1302, PHY 1304 or equivalent, and BIO 1355 or permission of instructor.*

PHY 1423 Medical Physics **4 QH**
Introduces the physical principles and basic mathematical methods underlying the various modalities of medical imaging. These include computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), single-photon emission tomography (SPECT), and ultrasound. Covers nuclear physics and the interaction of radiation with biological matter with application to radiation therapy. *Prereq. PHY 1302, PHY 1304 or equivalent, and BIO 1421 or permission of instructor.*

PHY 1451 Medical Imaging **4 QH**
Part 1 of a seminar series conducted by expert practitioners from Boston area hospitals. Examines the clinical applications of medical imaging methods (CT, MRI, and PET). Includes site visits to local hospitals and medical instrumentation companies. *Prereq. PHY 1423.*

PHY 1452 Radiation Therapy **4 QH**
Part 2 of a seminar series conducted by expert practitioners from Boston area hospitals. Examines the clinical applications of radiation therapy. *Prereq. PHY 1423.*

PHY 1453 Applications of Lasers in Medicine **4 QH**
Part 3 of a seminar series conducted by expert practitioners from Boston area hospitals. Examines the clinical applications of lasers and optical techniques. *Prereq. PHY 1404 and PHY 1423.*

PHY 1551 Electronics for Scientists 1 **4 QH**
With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2 **4 QH**
Continues PHY 1551. *Prereq. PHY 1551.*

PHY 1555 Wave Laboratory **4 QH**
Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experi-

ments in acoustics, optics, and microwaves to illustrate these problems. *Prereq. PHY 1224 or PHY 1302.*

PHY 1557 Advanced Physics Laboratory **4 QH**
Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq. PHY 1551 and PHY 1552.*

PHY 1561 Project Laboratory **4 QH**
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq. Permission of instructor.*

PHY 1711 Introduction to Astronomy 1 (Honors) **4 QH**
Honors equivalent of PHY 1111.

PHY 1721 Physics 1 **4 QH**
Honors equivalent of PHY 1221.

PHY 1722 Physics 2 **4 QH**
Honors equivalent of PHY 1222.

PHY 1723 Physics 3 **4 QH**
Honors equivalent of PHY 1223.

PHY 1724 Physics 4 **4 QH**
Honors equivalent of PHY 1224.

PHY 1885, PHY 1886, PHY 1887, PHY 1888 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

PHY 1888, 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Political Science

POL 1110 Introduction to Politics **4 QH**
Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (Core Category II)

POL 1111 Introduction to American Government **4 QH**
Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policy-making. (Core Category II)

POL 1112/IAF 1112 Introduction to International Relations **4 QH**
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (Core Category II)

POL 1113/IAF 1113 Introduction to Foreign Governments **4 QH**
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1114 The United States Constitution **4 QH**
Introduces the U.S. Constitution by exploring its theory, its origin, and the institutions by which it bestows and restrains power. Surveys the constitutional liberties guaranteed. Examines what this fundamental supreme United States law means today, two centuries after its ratification. Other topics include congressional areas of policy-making responsibility, presidential power, the role of the judiciary in the American system of government, and the reconciliation of majority rule with minority rights.

POL 1260 Public Policy Analysis **4 QH**
Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policymaking process. Introduces such concepts as problem definition, agenda-development, policy formation, implementation, and program evaluation. Examines basic policy analysis methods. (Core Category VI)

POL 1261 Public Administration **4 QH**
Provides a broad overview of the administrative aspects of public policies and programs. Topics include public management, organizations, budgeting, personnel administration, and program evaluation.

POL 1262 Bureaucracy and Government Organizations **4 QH**
Examines the general principles underlying the structures, processes, and operation of public organizations. Looks at the role of bureaucracies within the larger political system, as well as how public agencies develop and change over time.

POL 1266 Public Personnel Administration **4 QH**
Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining.

POL 1267 Politics of Budgeting and Taxation **4 QH**
Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context.

POL 1301 Research Methods 1 **4 QH**
Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq. Prior completion of college mathematics requirement.*

POL 1302 Research Methods 2 **4 QH**
Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of a program-

ming language to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq. POL 1301 and prior completion of college mathematics requirement.*

POL 1303 Political Behavior **4 QH**
Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics **4 QH**
Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe **4 QH**
Offers a comparative survey of the societies, economies, and political systems in the democracies of Western Europe. Examines governing structures and major political developments within the major European states, as well as major policy issues (e.g., nationalism, federalism, environmentalism) and issues of European integration within the European Union. (Core Category III)

POL 1308/AFR 1271 The Politics of Poverty **4 QH**
Explores how and why there is poverty, how it affects people's lives, and how it can be eliminated. Examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 International Political Economy **4 QH**
Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq. A course in either economics or international politics is recommended, but not required.* (Core Category V)

POL 1310 American Ideology **4 QH**
Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (Core Category V) *Prereq. Middler standing or above, or permission of instructor.*

POL 1312 Politics and the Mass Media **4 QH**
Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organizations **4 QH**
Focuses on the development of roles played by international governmental organizations, examining their dual roles as collections of sovereign states and as political actors in their own right. Analyzes the structure and functions of such global organizations as the United Nations as well as regional organizations like the European Union and Organization of American States.

POL 1314 Interest Groups and Public Policy **4 QH**
Surveys the roles of organized interests in American public policy-making. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1316 Contemporary Revolutionary Politics **4 QH**
Examines revolution as a political option and revolutionary movements throughout the world today. Examples will be taken from Marxism-Leninism (e.g., Bolshevik Russia, China, Cuba), revolutionary Islam (e.g., Iran, Algeria), and the anti-Communist forces in the former Soviet Union and eastern Europe. Examines the perennial conflict between revolution as an ideal and regime consolidation as a necessity. (Core Category VI)

POL 1317 Law and Society **4 QH**
Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.

POL 1318 State and Local Government **4 QH**
Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. *Prereq. POL 1111.*

POL 1319 Government and Politics of Massachusetts **4 QH**
Emphasizes the political and administrative aspects of government in Massachusetts. Considers the structure and functions of state government as well as major policy problems confronted by public officials. Analyzes the relationship between state and local governments in Massachusetts.

POL 1320 Parties and Elections **4 QH**
Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policy-making, and national and state historical trends.

POL 1322 World Politics **4 QH**
Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case-study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States–Soviet and Arab-Israeli viewpoints.

POL 1324 Urban Politics **4 QH**
Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective.

POL 1327 Gender Politics **4 QH**
Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the

woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in "new politics." Also covers political action to promote women's issues and modern feminism. (Core Category VI)

POL 1329 American Social Welfare Policy **4 QH**
Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system.

POL 1331 Science, Technology, and Public Policy **4 QH**
Considers the effects of science and technology on politics and policy-making in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to "solve" than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (Core Category VI)

POL 1332 Government and Politics of Japan **4 QH**
Focuses on the development of Japan's political system since World War II. Examines Japan's political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan's foreign policy; and business practices and organization. Raises issues concerning Japan's extraordinary economic success and the limitations of Japan as a model for other countries. (Core Category IV) *Not open to freshmen.*

POL 1334 Environmental Policy and Politics **4 QH**
Examines the policy-making processes, historical and socio-economic factors, political forces, governmental institutions, and global trends that shape environmental policy at national and sub-national levels in the United States. Gives attention to a wide range of environmental policy areas, with comparisons made between the United States and other nations.

POL 1335 The American Presidency **4 QH**
Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.

POL 1336 American Constitutional Law **4 QH**
Employs excerpts of United States Supreme Court decisions and other reading materials to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq. POL 1111 and junior or senior standing.*

POL 1337 United States Foreign Policy **4 QH**
Examines formulation and conduct of foreign policy and the United States since World War II.

POL 1338 Religion and Politics **4 QH**
Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the Religious Right in America. (Core Category V)

POL 1339 Current Political Issues **4 QH**
Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.

POL 1340 Crisis and Change in Central/Eastern Europe **4 QH**
Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia and examines political, economic, social, and international problems of post-communist development. (Core Category IV)

POL 1342/AFR 1342 Government and Politics of Africa **4 QH**
Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. (Core Category VI)

POL 1343 Politics and Violence in Northern Ireland **4 QH**
Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and the peace process. Draws comparative parallels, including possible lessons for the United States. (Core Category IV)

POL 1345 Government and Politics in the Middle East **4 QH**
Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (Core Category VI)

POL 1346 Gender, Family, and Politics in the Middle East **4 QH**
Surveys the roles that gender and family play in political, economic, and social issues of the Middle East. Focuses on several political systems to provide a view of the diversity and similarity between various governments and societies. Topics include women in development; the connection between family and political power; women and Islam; legal status of women; and women in liberation movements. *Prereq. POL 1345 or INT 1150/HST 1490 or permission of instructor.* (Core Category IV)

POL 1347 Russian Politics After Communism **4 QH**
Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of inter-ethnic strife. (Core Category IV)

POL 1348 Russian Foreign Policy **4 QH**
Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.

POL 1350 American Legislative Process **4 QH**
Explores the structures, dynamics, and styles inherent in public policy-making within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.

POL 1351 Techniques and Practices of Public Management **4 QH**
Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.

POL 1353 Law and Personal Morality **4 QH**
Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.

POL 1355 Ethnic Conflict **4 QH**
Analyzes the causes and consequences of ethnic political violence in the contemporary world. Examines selected cases based on their importance and their usefulness for understanding ethnic conflict (such as Bosnia, Canada, Northern Ireland, and states of the former Soviet Union). Considers various policies for preventing and resolving ethnic political violence. (Core Category IV)

POL 1362 Civil Liberties **4 QH**
Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.

POL 1364 Business and Government Relations **4 QH**
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.

POL 1368 Government and Politics of Latin America **4 QH**
Examines the governmental systems, political parties, socio-economic problems, and foreign policies of Latin American states. Focuses on political change. (Core Category IV)

POL 1369 Political Violence **4 QH**
Analyzes political violence in its various contemporary forms (for example, war, revolution, genocide, political terrorism, and military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence. (Core Category VI)

POL 1371 Government and Politics of China **4 QH**
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (Core Category IV)

POL 1373 Pre-Modern Political Thought **4 QH**
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance. (Core Category V) *Prereq. Middler standing or above.*

POL 1374 Modern Political Thought **4 QH**
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (Core Category V) *Prereq. Middler standing or above.*

POL 1378 Contemporary Political Thought **4 QH**
Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, and women's liberation. Also studies the decline of ideology and behavioralism.

POL 1379 Marx and Marxism **4 QH**
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (Core Category V)

POL 1382 Intergovernmental Relations **4 QH**
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.

POL 1384 Arab-Israeli Conflict **4 QH**
Analyzes the effects of the Arab-Israeli confrontation on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (Core Category VI)

POL 1386 International Law **4 QH**
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq. POL 1112.*

POL 1388 Political Polling and Survey Research **4 QH**
Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq. POL 1301.*

POL 1389 American National Security Policy **4 QH**
Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1396 Latino Politics in the U.S. **4 QH**
Focuses on Latinos in the U.S. political system. Latinos share many characteristics with previous wave of immigrants, but geographic proximity to Latin America and the constant influx of other Latinos present significant differences. Explores issues of Latino identity: who Latinos are, conflicting loyalties to particular group versus pan-Latino solidarity, their status in American society, and Latino relations with other American ethnic groups. Discusses these issues to provide the necessary background to explore Latino involvement in local, state, federal, and international politics. (Core Category IV)

POL 1410 Seminar in American Government **4 QH**
Offers an in-depth study of selected topics in American government. *Prereq. Senior political science major and permission of instructor.*

POL 1411 Seminar in International Relations **4 QH**
Offers an in-depth study of selected topics in international relations. *Prereq. Senior political science major and permission of instructor.*

POL 1413 Senior Seminar in Political Science **4 QH**
Offers an in-depth study of selected topics in political science. *Prereq. Senior political science major.*

POL 1415 Seminar in Public Law and Social Issues **4 QH**
Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than merely personal or political, answers to contentious legal questions. *Prereq. Junior or senior standing.*

POL 1710 Introduction to Politics (Honors) **4 QH**
Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) **4 QH**
Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) **4 QH**
Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 **4 QH each**
Directed Study
Offers independent work on chosen topics under the direction of members of the department. *Prereq. Junior or senior standing and permission of instructor.*

POL 1803 Internship in Politics **4 QH**
With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors. Prereq. Junior or senior standing normally required.*

POL 1804 Vote Smart Practicum **4 QH**
Offers supervised hands-on experience with a nationally recognized non-partisan voters' information resource center. Students are trained on the computer in the use of various databases, engage in assigned research tasks, and assist voters and journalists seeking information on candidates for federal and state office. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors.*

POL 1805 Internship in American Government and Politics **4 QH**
Students engage in an internship in the Federal government with department approval, under the supervision of a faculty member. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors. Prereq. Junior or senior standing usually required.*

POL 1815 Internship in State Government **6 QH**
Combines state government work experience with academic studies. Students work 15 hours per week in a state government office and attend classes every other week in which work experience and related readings are discussed. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors. Prereq. POL 1111 or POL 1318.*

Psychology

PSY 1110 Perspectives in Psychology 1 **4 QH**
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. *Students who earn credit for PSY 1111 will not earn credit for PSY 1110.* (Core Category II)

PSY 1111 Foundations of Psychology 1 **4 QH**
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 **4 QH**
Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq. PSY 1110 or PSY 1111.*

PSY 1113 Perspectives in Psychology 2 **4 QH**
Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (Core Category II) *Prereq. PSY 1110 or PSY 1111.*

PSY 1210 Research Methods in Psychology **4 QH**
Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq. PSY 1112 or PSY 1113.*

PSY 1211 Statistics in Behavioral Science 1 **4 QH**
Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq. MTH 1101 or MTH 1107, and PSY 1112, or permission of instructor.*

PSY 1212 Statistics in Behavioral Science 2 **4 QH**
Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq. PSY 1211.*

PSY 1215 Sexual Behavior **4 QH**
Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness **4 QH**
Introduces the varied scientific approaches to the study of consciousness and the diverse theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming; hypnosis, meditative states, pain perceptions, and anomalistic psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems. *Prereq. PSY 1112 or PSY 1113.*

PSY 1218 Psychology of Women **4 QH**
Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness **4 QH**
Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation **4 QH**
Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq. PSY 1112 or PSY 1113, or permission of instructor.*

PSY 1241 Developmental Psychology **4 QH**
Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq. PSY 1112 or PSY 1113.*

PSY 1242 Adult Development and Aging **4 QH**
Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq. PSY 1112 or PSY 1113.*

PSY 1243 Infant Development **4 QH**
Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq. PSY 1241 or ED 1102.*

PSY 1244 Childhood Mental Illness and Mental Retardation **4 QH**
Focuses on mental illnesses that are first diagnosed in childhood such as autism, phobias, conduct disorders, and attention-deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping. Covers etiological factors in mental retardation (e.g., maternal disease, lead poisoning, chromosome abnormalities). Describes personality characteristics of individuals with mental retardation as well as the effects of institutionalization, mainstreaming, and psychological interventions. *Prereq. PSY 1112.*

PSY 1251 Food, Behavior, and Eating Disorders **4 QH**
Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language **4 QH**
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113 or permission of instructor.*

PSY 1263 Nonverbal Communication **4 QH**
Examines the messages we send by posture, facial expression, voice quality, gestures, touch, gaze, and interpersonal distance. Examines origins and consequences of these behaviors as well as differences related to culture, personality, power, gender, and age. *Prereq. PSY 1112 or PSY 1113.*

PSY 1268 Psychology and Film **4 QH**
Uses selected films to investigate psychological subjects, including human development over the life cycle (particularly childhood and adolescence), family dynamics, sexuality, and psychopathology (trauma, anxiety and eating disorders, psychosis). *Prereq. PSY 1112 or PSY 1113.*

PSY 1271 Social Psychology **4 QH**
Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change and measurement; conformity; impression formation; and group processes (social facilitation, deindividuation, for example). *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1272 Personality 1 **4 QH**
Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq. PSY 1112 or PSY 1113.*

PSY 1273 Personality 2 **4 QH**
Continues PSY 1272. *Prereq. PSY 1272.*

PSY 1274 Psychology and the Law **4 QH**
Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1280/AFR 1280 Race and Social Identity **4 QH**
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American and white ethnic identity. Outlines the history of the concept of race in America. Studies ethnic identity as it has been conceptualized and measured by psychologists. Examines the psychology of inter-group relations and addresses strategies for reducing racism.

PSY 1351 Psychobiology **4 QH**
Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1362/LIN 1362 Language Acquisition **4 QH**
Examines how language develops in children. *Prereq. LIN 1118, PSY 1262, or permission of instructor.*

PSY 1364 Cognition **4 QH**
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113 or permission of instructor.*

PSY 1365 Language and the Brain **4 QH**
Focuses on linguistic behavior from a neuropsychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq. PSY 1262 or permission of instructor.*

PSY 1371 Industrial/Organizational Psychology **4 QH**
Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq. PSY 1271 and PSY 1211.*

PSY 1373 Abnormal Psychology 1 **4 QH**
Surveys the abnormal personality, including systems of diagnoses, defense mechanisms, and criteria of psychopathology. Examines the symptomatology, etiology, and dynamics of anxiety disorders (phobia, obsessions, compulsions, etc.), dissociative disorders (amnesia, multiple personality, etc.), and somatoform disorders. Examines case histories in detail. *Prereq. PSY 1112 or PSY 1113.*

PSY 1374 Abnormal Psychology 2 **4 QH**
Surveys psychological and somatic therapies. Examines the symptomatology, etiology, dynamics, and therapy of schizophrenia, paranoid disorders, mania, depression, and organic disorders. *Prereq. PSY 1373.*

PSY 1375 Clinical Case Study Development **4 QH**
Students reflect upon the clinical case study notes and personal journal entries made during the preceding clinical co-op experience. Students are expected to identify and research the psychological, neuropsychological, systemic, and behavioral aspects of disorders (e.g., mental retardation, eating disorders, schizophrenia) that they encountered. Evaluates proficiency in applying theoretical perspectives to research through written and oral reports. *This course fulfills the College of Arts and Sciences experiential education requirement for psychology majors.*

PSY 1381 Sensation **4 QH**
Provides an introduction to the study of our senses, with emphasis on vision, hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—eyes, ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq. PSY 1112 or PSY 1113; PSY 1351 is highly recommended or permission of instructor.*

PSY 1382 Perception **4 QH**
Offers a study of our awareness of the world around us, with an emphasis on visual and auditory perception. Covers perception of light, sound, space, form, motion, auditory scene analysis, and one or more of color, attention, music, and speech perception. Discusses biological reductionism, Gestalt theory, Gibson's direct perception theory, and Marr's computational theory. *Prereq. PSY 1112 or PSY 1113 or permission of instructor.*

PSY 1410 Systems and Theories of Psychology **4 QH**
Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq. Junior or senior status in psychology major or permission of instructor.*

PSY 1431 Behavior Therapies **4 QH**
Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq. PSY 1231 or permission of instructor.*

PSY 1442 Human Memory **4 QH**
Offers a detailed examination of how people learn and remember. Examines the different kinds of memory, short-term, episodic, and semantic, with emphasis on current theories of memory function and related experimental findings. *Prereq. PSY 1364 or PSY 1262.*

PSY 1451 Psychopharmacology **4 QH**
Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse. *Prereq. PSY 1351 or equiv. with permission of instructor.*

PSY 1471 Social-Personality Roundtable **4 QH**
Develops skills in conceptualization and discourse on current topics in social and personality psychology. Uses the combination of a speaker series paired with discussion, readings, and topical papers to promote critical thinking in psychology. *Prereq. PSY 1271 or PSY 1272.*

PSY 1499/LIN 1499 Psychology of Reading **4 QH**
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq. PSY 1262 or PSY 1364.*

Directed Studies — Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) **4 QH**
Honors equivalent of PSY 1110. (Core Category II)

PSY 1713 Perspectives in Psychology 2 (Honors) **4 QH**
Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study **4 QH**
For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 **4 QH each**
Directed Study
Offers empirical research under the direction of the psychology department, usually on a laboratory or field-based research project under the supervision of a faculty member. Requires a research paper, oral presentation, or poster presentation of the student's work. Interested students should consult directly with the research faculty member, or with a departmental adviser for guidance, at least one quarter before the directed study is undertaken. *Prereq. Permission of instructor.*

PSY 1895, PSY 1896, PSY 1897, PSY 1898 **4 QH each**
Junior/Senior Honors Program
For details contact the honors office.

PSY 1994 Independent Study **4 QH**
Offers a readings course for the student who wants guidance in the archival exploration and in-depth study of a topic of interest. Conducts study through a series of individual tutorials or discussions with a faculty member that typically involves an extensive, analytical review of the literature. Interested students should consult directly with the relevant faculty member, or with a department adviser for guidance in locating the most appropriate faculty person, at least one quarter before the directed study is undertaken. *Prereq. Permission of instructor.*

Laboratories

PSY 1511 Experimental Design in Psychology **4 QH**
Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq. PSY 1112 or PSY 1113 and PSY 1212.*

PSY 1530 Experiments in Learning and Motivation **4 QH**
Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles primarily through field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq. PSY 1231 and PSY 1211.*

PSY 1531 Learning and Motivation Laboratory **4 QH**
Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq. PSY 1212 and PSY 1231.*

PSY 1551 Laboratory in Psychobiology **4 QH**
Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq. PSY 1351 or permission of instructor.*

PSY 1553 Animal Behavior Research **4 QH**
Offers students the opportunity to examine key concepts and principles by conducting field studies at a local zoological park or facility following a broad survey of the animal kingdom to identify similarities and differences in the behavioral processes by which individuals and species adapt to their environments. Addresses, through individual or group research projects, such issues as adaptive specializations in learning; the advantages of living in social organization; animal communication; mechanisms of reproduction; cooperation and aggression; ontogeny of behavioral characteristics; and the adaptive roles of male-female differences. Introduces students to the skills of animal behavior research using a variety of field observation techniques that involve collecting and analyzing data and writing scientific reports on the projects. *Prereq. PSY 1112 or PSY 1113 and PSY 1211 or permission of instructor.*

PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1364 or PSY 1262.*

PSY 1571 Laboratory in Social Psychology **4 QH**
Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq. PSY 1212 and PSY 1271.*

PSY 1572 Personality Laboratory **4 QH**
Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq. PSY 1212 and PSY 1272.*

PSY 1575/AFR 1575 Community Psychology Laboratory **4 QH**
Students reflect upon real-world obstacles in conducting independent field research in communities in and around Northeastern during the quarter. Student reflections are used to guide research design, to evaluate theory, and to problem-solve social problems. Research topics may focus on battered women, HIV, student stress, perceptions of the media, church involvement in dealing with stress, or topics affecting large minority populations. Evaluates student performance through class discussions and written research reports. *Fulfills the College of Arts and Sciences experiential education requirement for psychology majors.*

PSY 1581 Sensation and Perception Laboratory **4 QH**
Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq. PSY 1212 and PSY 1381 or PSY 1382.*

Seminars

PSY 1610 Psychological Research and Personal Values **4 QH**
Students identify and reflect upon ethical concerns (e.g., related to confidentiality, animal use, racism, designing and applying research) that they encountered in their prior co-op/research experiences. Considers historical, psychological, philosophical, sociological, and spiritual perspectives. Students use reflective conversation to guide their ethical thinking, research, and problem solving. Evaluates research projects through written and oral reports. *Fulfills the College of Arts and Sciences experiential education requirement for psychology majors. Prereq. Any laboratory course in psychology and research or co-op experience in psychology.*

PSY 1614 Seminar on Heredity and Society **4 QH**
Focuses on the origins of the intelligence-testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq. Permission of instructor.*

PSY 1632 Seminar in Behavior Modification **4 QH**
Discusses topics in behavior modification in a seminar format. *Prereq. PSY 1231, PSY 1531, or permission of instructor.*

PSY 1651 Seminar in Psychobiology **4 QH**
Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq. PSY 1351 or permission of instructor.*

PSY 1661 Seminar in Psycholinguistics **4 QH**
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1662 Seminar in Cognition **4 QH**
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1671 Seminar in Social Psychology **4 QH**
Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq. PSY 1271 or permission of instructor.*

PSY 1672 Seminar in Clinical Psychology and Personality **4 QH**
Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq. PSY 1374 (may be taken concurrently).*

PSY 1681 Seminar in Sensation and Perception **4 QH**
Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and lawful manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq. PSY 1351 and PSY 1381 or PSY 1382.*

PSY 1888, 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

PSY 1990 and PSY 1991 Internship in Psychology **4 QH each**
Offers supervised experiences in the application of psychology in instructional, clinical, or other applied settings. *Prereq. Junior or senior psychology major, minimum QPA of 3.0, and approval by department.*

Note: *PSY 1410, Systems and Theories of Psychology, also counts as a seminar.*

Sociology

SOC 1100 Introduction to Sociology **4 QH**
Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life **4 QH**
Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1103 American Society **4 QH**
Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq. SOC 1100 or equivalent.*

SOC 1104 Contemporary Japanese Culture and Society **4 QH**
Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (Core Category IV)

SOC 1105 Society and Culture in Russia and the Former Soviet Union **4 QH**
Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (Core Category IV)

SOC 1120 Sociology of Boston **4 QH**
Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.

SOC 1121 Doing Sociology **4 QH**
Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use the computer during the course. (Core Category II)

SOC 1125 Social Problems **4 QH**
Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.

SOC 1135 Social Psychology **4 QH**
Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.

SOC 1140 Sociology of Prejudice and Violence **4 QH**
Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1146 Environment and Society **4 QH**
Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (Core Category VI)

SOC 1147 Urban Social Problems **4 QH**
Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality **4 QH**
See INT 1150 for course description.

SOC 1155 Sociology of the Family **4 QH**
Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (Core Category V)

SOC 1156 Violence in the Family **4 QH**
Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Gender in a Changing Society **4 QH**
Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.

SOC 1168 The Social Movements of the 1960s **4 QH**
Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations **4 QH**
Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq. SOC 1100 or equivalent.*

SOC 1175 Sociology of Work **4 QH**
Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (Core Category VI)

SOC 1176 Sociology of Business/Industry **4 QH**
Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World **4 QH**
Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working **4 QH**
Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1185 Deviant Behavior and Social Control **4 QH**
Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.

SOC 1190 Juvenile Delinquency **4 QH**
Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society **4 QH**
Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism **4 QH**
Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.

SOC 1205 Law, Crime, and Social Justice **4 QH**
Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police **4 QH**
Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1240/HS 1240 Sociology of Human Service Organizations **4 QH**
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty **4 QH**
Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1255 Sport in Society **4 QH**
Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1276 Sociology of Popular Culture **4 QH**
Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1285 Environment Technology and Society **4 QH**
Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological "fix" be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (Core Category VI)

SOC 1300 Classical Social Thought **4 QH**
Traces the development of sociology from the history of social thought. *Prereq. Three sociology/anthropology courses.*

SOC 1301 Current Social Thought **4 QH**
Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq. Three sociology or anthropology courses.*

SOC 1302 Feminist Perspectives on Society **4 QH**
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers

and evaluates women's views of social life as well as recognizes the differences among women. (Core Category VI)

SOC 1310 Class, Power, and Social Change **4 QH**
Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (Core Category V) *Prereq. One sociology course and middler standing or permission of instructor.*

SOC 1320 Introduction to Statistical Analysis **4 QH**
Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq. SOC 1100 or permission of instructor.*

SOC 1321 Research Methods 1 **4 QH**
Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq. SOC 1100 and SOC 1320, or permission of instructor.*

SOC 1322 Research Methods 2 **4 QH**
Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq. SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.*

SOC 1324/HS 1260 Human Services Research and Evaluation **4 QH**
Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq. SOC 1320 or other statistics, SOC 1240, or permission of instructor.*

SOC 1325 Reporting on Society **4 QH**
Gives journalism students the opportunity to conduct participant observation research. Requires students to participate in and directly observe the activities of a small group as well as to analyze the group's culture from a sociological perspective. *Open to nonjournalism majors with instructor's permission.*

SOC 1347 Community Analysis **4 QH**
Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1350 Women in Jewish Culture **4 QH**
Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship of women to Judaism by trying to recover Jewish women's experiences in America since the turn of the century by looking at some key institutions—work, family, religion, the feminist movement, the media, literature, and film.

SOC 1470 Sociology of Religion **4 QH**
Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq. SOC 1100.*

SOC 1485 Computers and Society **4 QH**
Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (Core Category VI) *Prereq. Junior in computer science or middler with ability to program.*

SOC 1500 Applied Sociology: Practice and Theory **4 QH**
The academic component of the experiential education requirement for sociology majors; to be taken after students have completed the experiential component. Provides a seminar format in which students will reflect upon their approved experience (e.g., co-op, internship, community service, etc.) and integrate it into a research project. Students who have completed study abroad or a service learning course in the department may not have to take this course. *Prereq. Sociology majors only.*

SOC 1501 Social Policy and Social Intervention **4 QH**
Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1601 Seminar in Current Emphases in Sociology **4 QH**
Reviews and discusses selected sociological topics. *Prereq. Junior or senior standing in sociology/anthropology or permission of instructor.*

SOC 1700 Introduction to Sociology (Honors) **4 QH**
Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors) **4 QH**
Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study **4 QH each**
Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq. Junior or senior standing in sociology or permission of instructor.*

SOC 1821, SOC 1822, SOC 1823, SOC 1824 **4 QH**
Junior/Senior Honors Project
For details, contact the honors office.

SOC 1888, 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Theatre

THE 1100 Introduction to Theatre Arts **4 QH**
Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (Core Category II)

THE 1106 Theatre History 1—Beginnings to Renaissance **4 QH**
Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

THE 1107 Theatre History 2—Renaissance to Naturalism **4 QH**
Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)

THE 1111 American Musical Theatre **4 QH**
Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.

THE 1112 Dramatic Theory and Criticism **4 QH**
Examines the major theoretical statements about Western theatre from Greece to present day. Devotes a significant portion of the course to twentieth-century critical strategies.

THE 1114 Theatre in Society **4 QH**
Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (Core Category III)

THE 1116 The American Theatre **4 QH**
Traces the historical development of theatre in America, as well as its role as a social institution, economic enterprise, and art form.

THE 1118 Black Theatre in America **4 QH**
Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's Dutchman.

THE 1121 Contemporary Theatre **4 QH**
Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth-century American and European theatre.

THE 1127 The Comic Theatre **4 QH**
Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the comic director, and the comedic actor. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

THE 1140 Playwriting 1 **4 QH**
Offers students the opportunity to develop a series of dramatic dialogues that culminate in the writing of a one-act play. Uses a workshop format.

THE 1149 Script Analysis for the Stage **4 QH**
Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq. Theatre major or minor.*

THE 1150 Introduction to Acting **4 QH**
Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom of expression.

THE 1155 Voice for the Theatre **4 QH**
Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

THE 1160 Movement 1 **4 QH**
Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq. Theatre major or permission of instructor.*

THE 1180 Concepts of Direction **4 QH**
Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq. THE 1150 and THE 1212.*

THE 1200 Stagecraft **4 QH**
Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq. THE 1206 or departmental permission.*

THE 1206 Technical Theatre 1 **4 QH**
The initial technical theatre course required of all majors covering the basic skills necessary in scene construction, stage lighting, and costume construction.

THE 1207 Technical Theatre 2 **4 QH**
Covers the basic steps in stage management and stage makeup. Required of all majors.

THE 1208 Technical Theatre 3 **4 QH**
Covers the basic skills needed for scenery, lighting, and costume design. Required for production concentration. *Prereq. THE 1206 and THE 1207.*

THE 1209 Theatrical Drafting **4 QH**
Exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction through work on supervised classroom projects. *Prereq. THE 1200.*

THE 1210 Scenic Design for the Stage **4 QH**
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, et cetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq. THE 1200, THE 1212, or permission of instructor.*

THE 1212 Introduction to Theatrical Design **4 QH**
Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles **4 QH**
Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq. THE 1210.*

THE 1225 Scene Painting **4 QH**
Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq. THE 1200 or permission of instructor.*

THE 1226 Lighting Design for the Stage **4 QH**
Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq. THE 1209 or departmental permission.*

THE 1261 Costuming 1 **4 QH**
Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction **4 QH**
Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup **4 QH**
Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq. Theatre major or permission of instructor.*

THE 1284 Theatre Management **4 QH**
Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre **4 QH**
Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2 **4 QH**
Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq. THE 1150 and permission of department chair.*

THE 1301 Acting 3 **4 QH**
Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq. THE 1300 and permission of instructor.*

THE 1302 Acting 4 **4 QH**
Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq. THE 1301 and permission of instructor.*

THE 1316 Acting for the Camera (Television) **4 QH**
Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq. THE 1155, THE 1160, and THE 1302.*

THE 1325 Musical Theatre Technique **4 QH**
Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. *Prereq. THE 1150, THE 1300, and permission of instructor.*

THE 1370 Rehearsal and Performance **4 QH**
Requires students to research, prepare, and perform either a substantial acting role, a design assistantship, a crew head, a dramaturgy, or a stage management position under the direction and guidance of faculty. Students are expected to keep a rehearsal log and will synthesize and evaluate the experience in a final paper. This course may be repeated for credit up to three times for theatre majors. *Fulfills the College of Arts and Sciences experiential education requirement for theatre majors. Prereq. Permission of instructor.*

THE 1400 Costuming 2 **4 QH**
Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq. THE 1261 or permission of instructor.*

THE 1410 Technical Production **4 QH**
Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq. All courses in production/design concentration and permission of instructor.*

THE 1420 Advanced Drafting and Construction **4 QH**
Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. *Prereq. THE 1209.*

THE 1430 Lighting Design 2 **4 QH**
Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq. THE 1226.*

THE 1510 Twentieth-Century Theatre **4 QH**
Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

THE 1511 Theatre Through the Lens of Modernism **4 QH**
Covers seminal playwrights of the late nineteenth and twentieth centuries whose works have had a major impact on both modern drama and theatrical methods of production. (Core Category V)

THE 1800, THE 1801, THE 1802, THE 1803 **1 QH each**
Practicum in Production
Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq. Departmental permission.*

THE 1804, THE 1805, THE 1806, THE 1807 Practicum in Production **1 QH each**
Offers lab practice in rehearsal and performance for production; can be repeated for credit (maximum of four credits). *Prereq. Departmental permission.*

THE 1810, THE 1811, THE 1812, THE 1813 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

THE 1820, THE 1821, THE 1822, THE 1823 **4 QH each**
Directed Study

THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849 **4 QH each**
Special Topics in Theatre Performance
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 **4 QH each**
Special Topics in Theatrical Design
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1888, THE 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

THE 1890, THE 1891, THE 1892, THE 1893 **4 QH each**
Special Topics in Theatre History/Dramatic Criticism
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1899 Advanced Television Production **4 QH**
Offers students the opportunity for in-depth examination of a subject of particular significance to theatre/television production.

Business Administration

Accounting

ACC 1111 Financial Accounting **4 QH**
Covers the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. *Prereq. Sophomore standing.*

ACC 1112 Managerial Accounting **4 QH**
Introduces students to managerial accounting concepts and analysis reports and decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of cash flows; cost management and behavior; cost-volume-profit analysis; ABC accounting; and relevant costs for decisions. *Prereq. ACC 1111 and sophomore standing.*

ACC 1331 Intermediate Accounting 1 **4 QH**
Constitutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq. ACC 1111 or equivalent and middler standing.*

ACC 1332 Intermediate Accounting 2 **4 QH**
Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Specific topics include fixed asset and intangible asset accounting, current and long-term liabilities, contingencies, pensions and other post-employment benefits, and leases. *Prereq. ACC 1331 and middler standing.*

ACC 1339 Cost Accounting **4 QH**
Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq. ACC 1112 and middler standing.*

ACC 1343 Intermediate Accounting 3 **4 QH**
Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq. ACC 1332 or permission of instructor.*

ACC 1345 Accounting Systems **4 QH**
Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach to consider the appropriate use of computer technology in designing new systems. Covers system analysis and design concepts, files and database design, and how to control specific accounting applications. Provides hands-on experience in operating a computerized accounting system. *Prereq. ACC 1331, introductory computer course, or permission of instructor, and middler standing.*

ACC 1347 Auditing **4 QH**
Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq. ACC 1332 or ACC 1343.*

ACC 1351 Federal Income Taxes 1 **4 QH**
Emphasizes basic understanding of the federal income tax structure relating to individuals. Requires completion of tax return problems and research cases directed at addressing various tax situations. Through these projects, the different sources of tax authority are introduced. *Prereq. ACC 1332 or permission of instructor.*

ACC 1512 Federal Income Taxes 2 **4 QH**
Continues the examination of the federal income tax system. Emphasizes the tax implications of property transactions and choice of business entity. Transactions between owners and business entities are also examined. A major emphasis is given to tax planning considerations, especially corporate tax consequences. *Prereq. ACC 1351.*

ACC 1521 Advanced Accounting **4 QH**
Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships; business combinations and consolidated financial statements; bankruptcy, liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and accounting for governmental units. *Prereq. ACC 1343 or permission of instructor.*

ACC 1550 Forensic Accounting **4 QH**
Covers the nature, function, and environment of forensic accounting through class discussion, related exercises, casework, and guest speakers. Introduces students to basic accounting principles and attempts at fraudulent financial reporting. Topics include: funds flow within financial institutions; fraud schemes to "cook" the books; red flags related to fraud; concealed income analysis; and the accumulation/presentation of evidence of fraud. *Prereq. ACC 1111.*

ACC 1591 Independent Study **1 QH**
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study **2 QH**
Same as ACC 1591.

ACC 1593 Independent Study **3 QH**
Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study **4 QH each**
Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors) **4 QH**
See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors) **4 QH**
See course description for ACC 1112.

ACC 1810 Big-Picture Accounting (Honors) **4 QH**
Helps students make managerial decisions, such as pricing, product design, or make-or-buy decisions, using accounting information—especially data on product and service costs—in combination with input from other corporate functions. Offers students the opportunity to combine knowledge gained about costs with knowledge of operations, finance, marketing, the overall organization, and the competitive context to make sound business decisions. Examines a variety of firms facing the challenge of managing in a global economy in the Information Age. Discusses how to implement, in an international and multicultural context, the action plans generated from analyzing complex information. Tests action plans for consistency with critical goals such as quality, customer focus, and continuous improvement. *Prereq. Honors participation or instructor's permission.*

ACC 1891 Honors Thesis in Progress **0 QH**

ACC 1892 Honors Thesis **8 QH**

ACC 1893 Honors Thesis in Progress **0 QH**

ACC 1894 Honors Thesis **12 QH**

Entrepreneurship

ENT 1330 Entrepreneurship **4 QH**
Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business **4 QH**
Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures **4 QH**
Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute **8 QH**
Provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Sponsored by the United States Small Business Administration (SBA). Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq. Junior standing or permission of instructor.*

ENT 1591 Independent Study **1 QH**
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study **2 QH**
Same as ENT 1591.

ENT 1593 Independent Study **3 QH**
Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study **4 QH each**
Same as ENT 1591.

ENT 1598 Independent Study **8 QH**
Same as ENT 1591.

ENT 1891 Honors Thesis in Progress **0 QH**

ENT 1892 Honors Thesis **8 QH**

ENT 1893 Honors Thesis in Progress **0 QH**

ENT 1894 Honors Thesis **12 QH**

Finance and Insurance

FIN 1333 Financial Institutions and Markets **4 QH**
Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq. ACC 1112 and middler standing.*

FIN 1335 Managerial Finance **4 QH**
Provides students the opportunity to gain knowledge of the advanced tools and concepts used in the financial management of the firm. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq. FIN 1439.*

FIN 1346 Investment Management **4 QH**
Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq. FIN 1439.*

FIN 1438 Principles of Finance 1 **4 QH**
Analyzes financial statements of the firm with emphasis on long-term planning and financing, financial policy, and short-term planning. Covers both international corporate finance and ethics in finance. Places strong emphasis on the link of finance to other functional areas such as strategy, marketing, operations, and accounting. *Prereq. ACC 1112, MSC 1201.*

FIN 1439 Principles of Finance 2 **4 QH**
Introduces students to financial markets and financial institutions. Familiarizes students with security market operations and financial assets. Covers interest rate theory, risk and return, diversification, and equilibrium models of the risk-return trade-off. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq. ACC 1112, FIN 1438, MSC 1201, and middler standing.*

FIN 1503 Taxes and Financial Decisions **4 QH**
Uses the case method to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies, and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq. FIN 1439 and middler standing.*

FIN 1520 Options and Futures Markets **4 QH**
Explores the concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage risk. Topics include mechanics of these markets, techniques that can hedge risk exposure, tracing methods, and current developments in the field. *Prereq. FIN 1346.*

FIN 1526 Securities Markets **4 QH**
Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq. FIN 1439.*

FIN 1530 Working Capital Management **4 QH**
Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq. FIN 1439.*

FIN 1531 Capital Investment Decision Analysis **4 QH**
Explores recent developments in financial management and financial analysis through the use of modern finance theory to make capital allocation decisions that lead to long-run value maximization for the corporation. Focuses on applications and financial model building. Examines risk analysis for capital investment decisions by building spreadsheet models and utilizing computer simulation methods as a risk analysis tool. Studies the useful applications of risk analysis methods in other areas of corporate finance and investments, e.g., investment analysis and portfolio management. Utilizes valuation analysis models to merge financial, corporate, and business strategies to measure and manage the value of a corporation. Presents materials relevant to corporate managers interested in value-based management systems and to securities analysts. *Prereq. FIN 1439.*

FIN 1535 Issues in Corporate Control **4 QH**
Examines the nature of conflicts over control of the corporation. Applies modern finance theory and practice to the issues raised and draws on seminal works in the finance and economics literature that influence the current debates in this area. Discusses legal and ethical considerations that are especially important in corporate control issues. Uses cases involving well-known takeovers of the 1980s as well as current hostile takeover battles to illustrate the theories discussed. *Prereq. FIN 1439.*

FIN 1540 Management of Financial Institutions **4 QH**
Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq. FIN 1439 or FIN 1333.*

FIN 1543 Modern Portfolio Management **4 QH**
Analyzes the process of constructing and managing an asset portfolio to meet stated objectives. Exposes students to theoretical models of portfolio choice and statistical analysis of appropriate data. Offers students the opportunity to design a portfolio that combines theory with the practice of portfolio management in an international context. Covers performance evaluation. *Prereq. FIN 1346.*

FIN 1544 Bank Management **4 QH**
Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and invest-

ment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq. FIN 1439 or FIN 1333.*

FIN 1545 Investment Banking **4 QH**
Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq. FIN 1439.*

FIN 1549 Principles of Real Estate **4 QH**
Surveys the field of real estate, including principles of real estate law, transactions, brokerage, management, development, valuation, taxation, finance, and investment. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq. FIN 1439.*

FIN 1550 Real Estate Finance and Investment **4 QH**
Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and secondary mortgage markets. Surveys methods of valuing income properties. *Prereq. FIN 1549.*

FIN 1562 Employee Benefits Management **4 QH**
Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq. FIN 1439.*

FIN 1566 Risk Management and Insurance **4 QH**
Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq. FIN 1439.*

FIN 1580 Personal Financial Management **4 QH**
Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq. FIN 1438.*

FIN 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study **2 QH**
Same as FIN 1591.

FIN 1593 Independent Study **3 QH**
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study **4 QH each**
Same as FIN 1591.

FIN 1739 Principles of Finance 2 (Honors) **4 QH**
Analyzes financial statements of the firm with emphasis on long-term planning and financing, financial policy, and short-term planning. Covers both international corporate finance and ethics in finance. Places strong emphasis on the link of finance to other functional areas such as strategy, marketing, operations, and accounting. *Prereq. ACC 1112, FIN 1438, MSC 1201.*

FIN 1759 International Financial Markets **4 QH**
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq. FIN 1439.*

FIN 1760 International Financial Management **4 QH**
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq. FIN 1759.*

FIN 1770 Entrepreneurial Finance **4 QH**
Provides a summary overview of entrepreneurial finance with a specific focus on small businesses, corporate ventures, and intrapreneurship. Applies knowledge of corporate finance in the context of starting, acquiring, managing, and divesting a business or a business unit within a corporation. Covers such topics as analyzing the financial needs of new ventures, sources of financing, managing decline, valuation, and exit strategies. Provides students with the opportunity to work with College of Engineering students in a special project funded by the General Electric Foundation.

FIN 1818 Turnaround Management (Honors) **4 QH**
Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq. Honors participation or permission of instructor.*

FIN 1820 Fixed Income Securities and Risk (Honors) **4 QH**
Exposes students to theory, applications, and evidence concerning highly sensitive interest rate products. Teaches recent developments in pension fund management, asset/liability management, duration matching, "gap" management, concurrent interest rate and exchange rate management, and other important issues confronting domestic and international financial and corporate management. Students can learn how to customize a risk management program. *Prereq. FIN 1346.*

FIN 1891 Honors Thesis in Progress **0 QH**

FIN 1892 Honors Thesis **8 QH**

FIN 1893 Honors Thesis in Progress **0 QH**

FIN 1894 Honors Thesis **12 QH**

Human Resources Management

HRM 1332 Introduction to Human Resources Management **4 QH**
Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1345 Managing Employee Relations **4 QH**
Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration **4 QH**
Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1349 Selection and Assessment of Employees **4 QH**
Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1350 Skills of Leading and Managing **4 QH**
Identifies the basic behavioral skills of the manager and leader role. Engages students in a number of activities that will provide the opportunity to develop those skills, including motivating, supervising, communicating, resolving conflict, leading, coaching, and negotiating. Emphasizes self-assessment and experiential exercises aimed at skill development. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1432 Organizational Behavior **4 QH**
Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing. (Not open to College of Business Administration students.)*

HRM 1433 Organizational Behavior and Design **8 QH**
Helps managers and potential managers develop people skills. Focuses on the individual, interpersonal, group, and organizational level. Uses case studies, simulation, role playing, and theory to help students learn concepts and techniques of managing with and through people. Develops skills through practice. *Prereq. Middler standing.*

HRM 1519 Leadership **4 QH**
Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1587 Training and Development **4 QH**
Explores contemporary methods for developing and delivering training programs that enhance performance at both an individual and organizational level. Emphasizes practical application in the areas of need analysis, curriculum design, learning objectives, program development, materials preparation, training interventions, course evaluation, and facilitation skills. Gives students the opportunity to develop, conduct, and evaluate training sessions. *Prereq. HRM 1433.*

HRM 1591 Independent Study **1 QH**
Allows a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study **2 QH**
Same as HRM 1591.

HRM 1593 Independent Study **3 QH**
Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 Independent Study **4 QH each**
Same as HRM 1591.

HRM 1760 International Labor Relations Systems **4 QH**
Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings **4 QH**
Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1826 Cross-Cultural Management Through Literature **4 QH**
Focuses on helping students develop skills in cross-cultural management using recent articles from business journals as well as short stories from authors around the world. Discusses these stories using the management articles as an analytical framework. Topics include culture shock, repatriation, the meaning of work and personal values, power and authority, status and hierarchy, ethics, and change. *Prereq. Honors participation or instructor's permission.*

HRM 1891 Honors Thesis in Progress **0 QH**

HRM 1892 Honors Thesis **8 QH**

HRM 1893 Honors Thesis in Progress **0 QH**

HRM 1894 Honors Thesis **12 QH**

International Business Administration

INB 1338 Introduction to International Business **4 QH**
Focuses on the broad cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; and the development of management strategies for international businesses. *Prereq. Middler standing.*

INB 1352 Seminar in International Business **4 QH**
Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing.*

INB 1731 Cultural Aspects of International Business **4 QH**
Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management **4 QH**
Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

MGT 1115 Introduction to Business **4 QH**
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business **4 QH**
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1350 Advanced Strategic Management **4 QH**
Emphasizes the systems designed by managers to facilitate organizational change and effective strategy implementation. Develops a framework for understanding and managing the complex interrelationships that exist among strategy, structure, culture, control systems, and management style, and their impact on the organization's performance, through readings and case discussions. Includes exploration of current strategic management issues, such as global expansion, corporate renewal, quality assurance, innovation and technology, strategic alliances, project management, and integrating functional perspectives, through discussion of current and classic strategic management writings. *Prereq. MGT 1450.*

MGT 1446 Managing Legal, Ethical, and Social Issues **4 QH**
Focuses on the legal, social, ethical, and economic influences as well as domestic and international cultural factors affecting business. Treats various ways the manager can respond to these influences. Topics include the several possible models of the business and society relationship; the foundations of personal and managerial ethics; the business, government, and society interrelationships; ways the manager can address various stakeholder interests; and strategic and corporate public policy consequences of management's responses to specific social issues. *Prereq. Junior standing.*

MGT 1450 Business Policy **4 QH**
Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq. Senior standing.*

MGT 1575 Negotiations **4 QH**
Focuses attention on the strategies and techniques employed in the negotiations process. Includes familiarization with related literature, student role-playing, and interaction with professionals involved in private and public sector negotiations.

MGT 1580 Intercultural Negotiation and Conflict **4 QH**
Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.

MGT 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MGT 1592 Independent Study **2 QH**
Same as MGT 1591.

MGT 1593 Independent Study **3 QH**
Same as MGT 1591.

MGT 1594, MGT 1595, MGT 1596, MGT 1597 Independent Study **4 QH each**
Same as MGT 1591.

MGT 1803 Management and the Internet: Competition, Strategy, and Policy **4 QH**
Discusses the dynamics of cyberspace and what it takes to function effectively in it as a manager and citizen. Focuses on the explosive global growth of the Internet and cyberspace as well as how the new environment of cyberspace is transforming corporate strategies in the global economy and in individual and group relationships. Provides the opportunity to develop expertise in electronic conferencing and techniques for Internet-based information discovery, evaluation, and analysis by holding part of the seminar on-line. Explores a wide range of state-of-the-art issues, including digital literacy, global digital commerce, censorship, privacy, Internet policy, and the impact of cyberspace on personal identity. Includes the opportunity to develop a significant research project on a cyberspace topic of interest. *Prereq. Honors participation or instructor's permission.*

MGT 1820 Independent Study (Honors) **4 QH**
Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.

MGT 1842 World of Consulting (Honors) **4 QH**
Focuses on providing an overview of the consulting world. Topics include the structure of the consulting industry, covering the various types of consulting organizations from large to small, with an emphasis on those specializing in strategy consulting. Analyzes such corporations as Bain & Co., McKinsey, AD Little, and Andersen Consulting, as well as the other "big six" firms, which have in recent years become major players on the world consulting scene. Offers students the opportunity to gain an appreciation of the importance of these organizations in the global business arena, describes their various modes of operation, and introduces career opportunities available in the field of consulting. *Prereq. Honors participation or permission of instructor.*

MGT 1891 Honors Thesis in Progress **0 QH**

MGT 1892 Honors Thesis **8 QH**

MGT 1893 Honors Thesis in Progress **0 QH**

MGT 1894 Honors Thesis **12 QH**

Management Science

MSC 1200 Business Statistics 1 **4 QH**
Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. *Prereq. MTH 1114.*

MSC 1201 Business Statistics 2 **4 QH**
Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time series analysis. *Prereq. MSC 1200.*

MSC 1226 Computer-Based Information Systems **4 QH**
Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to analyze a business case, applying their technology and problem-solving skills.

MSC 1330 Data Management **4 QH**
Builds on the functional skills learned in MSC 1226. Exposes students to the essentials of data management. Topics include database design, selection and use of a database software package, database administration security, privacy, and data recovery. *Prereq. MSC 1226.*

MSC 1332 Decision Support Systems for Business **4 QH**
Provides students with an understanding of the impact of computer-based tools on business decision making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision support software such as graphics and expert systems on both mainframe and microcomputers. Gives students the opportunity to build a decision support system and create the supporting system documentation and user manual in a course project. *Prereq. MSC 1226.*

MSC 1335 Telecommunications and Networks **4 QH**
Reviews business telecommunications. Focuses on the design, use, and management of networks. Topics include telecommunications technology, network structures, and current telecommunication applications in business such as electronic mail, teleconferencing, and distributed applications. *Prereq. MSC 1226.*

MSC 1336 Business Programming **4 QH**
Provides students with experience in structured reasoning and programming. Builds upon the skills mastered in MSC 1330. Gives students the opportunity to gain an appreciation for design, coding, debugging, and executing program modules. Emphasizes the design discipline required to create such modules and the productivity gain that can be realized by employing object modules of this type in a business setting. *Prereq. MSC 1226, MSC 1330.*

MSC 1341 Information Resource Management **4 QH**
Examines the major organizational and managerial issues associated with managing the information resource focusing on three thematic components. Gives students the opportunity to assume a strategic viewpoint and consider using information to achieve competitive advantage, create new products or services, or to reengineer the business; learn about using information technology to support the functional areas of the business such as finance, manufacturing, or human resources; consider issues related to managing information technology such as outsourcing IS applications, project management, and investing in new technology. *Prereq. MSC 1226 and junior standing.*

MSC 1342 Business Systems Integration **4 QH**
Explores strategies for the functioning integration of information systems in both the office and the factory. Explores strategies for systems integration through a project requiring students to form companies, analyze their data needs, design and build a set of information systems, and recommend a strategy for data architecture integration. This is the capstone course for the MIS concentration. *Prereq. MSC 1226, MSC 1330, MSC 1332, MSC 1335, MSC 1341. Suggested MSC 1336.*

MSC 1433 Quantitative Models in Business **4 QH**
Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Covers decision trees, decision analysis, linear programming, and simulation. *Prereq. MSC 1201.*

MSC 1441 Operations Management **4 QH**
Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications.

MSC 1566 Quality Management **4 QH**
Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of quality experts such as Deming, Juran, and Ishikawa. *Prereq. MSC 1201 and MSC 1441.*

MSC 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study **2 QH**
Same as MSC 1591.

MSC 1593 Independent Study **3 QH**
Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study **4 QH each**
Same as HRM 1591.

MSC 1701 Business Statistics 2 (Honors) **4 QH**
See course description for MSC 1201.

MSC 1826 Business Forecasting (Honors) **4 QH**
Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that involve forecasting. *Prereq. MSC 1201.*

MSC 1891 Honors Thesis in Progress **0 QH**

MSC 1892 Honors Thesis **8 QH**

MSC 1893 Honors Thesis in Progress **0 QH**

MSC 1894 Honors Thesis **12 QH**

Marketing

MKT 1331 Marketing Management **4 QH**
Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 1435 and middler standing.*

MKT 1341 Marketing Research **4 QH**
Focuses on the survey research process and the analysis of data using SPSS. Covers topics such as problem definition, research design, sampling, questionnaire design, data collection, and data analysis. Students expected to work on group projects. Requires no previous computer experience. *Prereq. MKT 1331 and MSC 1201.*

MKT 1351 Competitive Strategy **4 QH**
A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq. MKT 1331 and senior standing.*

MKT 1435 Introduction to Marketing **4 QH**
Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing.*

MKT 1501 Introduction to Retailing **4 QH**
Explores the dynamics of retailing and the range of firms that make up the retailing industry. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing, and retailing's role in the economy. *Prereq. MKT 1435 and middler standing.*

MKT 1503 Retail Merchandising and Control **4 QH**
Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq. MKT 1435 or permission of instructor.*

MKT 1515 Marketing in the Service Sector **4 QH**
Provides a basic treatment of methods and techniques for marketing in the service sector, which includes sports, recreation, public service, banking, insurance, and hotels. Analyzes a number of descriptive studies covering the application of marketing principles in key service areas as well as the principles themselves.

MKT 1518 Marketing and Technology **4 QH**
Explores the impact of the Internet, the World Wide Web, and emerging technological innovations such as wireless communication and digital media on the marketing of goods and services. Examines consumer response to these innovations and factors that lead to the adoption of these new technologies. Offers students the opportunity to study how electronic commerce is changing the way firms interact with the market and how firms are taking advantage of these new technologies to improve their marketing strategies. *Prereq. MKT 1435 or MKT 1735 and junior or senior standing.*

MKT 1523 Advertising Management **4 QH**
Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq. MKT 1331 and middler standing.*

MKT 1531 Sales Management **4 QH**
Provides training in effective selling skills and how to manage accounts. Discusses how customers buy products and services and how this relates to a company's sales process: prospecting accounts, making sales presentations, handling customer objections, closing sales, and post-sale servicing of accounts. Also covers current approaches such as relationship and partnership selling. *Prereq. MKT 1331 and middler standing.*

MKT 1542 Business-to-Business Marketing **4 QH**
Examines corporate buyers and how they differ from household buyers/consumers. Studies company-to-company marketing and how it differs from consumer products marketing. Covers product and pricing elements as well as the role of industrial distributors and sales organizations. *Prereq. MKT 1331 and middler standing.*

MKT 1545 New Product Development **4 QH**
Focuses on the challenges and decisions managers face in creating, developing, launching, and managing new products and services. Special emphasis is given to the stages of the new product development process, the information needs in each stage, and approaches for gathering needed information. *Prereq. MKT 1331.*

MKT 1553 Foundations of Consumer Behavior **4 QH**
Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq. MKT 1331 and middler standing.*

MKT 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MKT 1592 Independent Study **2 QH**
Same as MKT 1591.

MKT 1593 Independent Study **3 QH**
Same as MKT 1591.

MKT 1594, MKT 1595, MKT 1596, MKT 1597 **4 QH each**
Independent Study
Same as HRM 1591.

MKT 1735 Introduction to Marketing (Honors) **4 QH**
Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through discussions, lectures, readings, and group projects. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing and honors participation.*

MKT 1760 International Marketing **4 QH**
Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq. MKT 1331 and middler standing.*

MKT 1891 Honors Thesis in Progress **0 QH**

MKT 1892 Honors Thesis **8 QH**

MKT 1893 Honors Thesis in Progress **0 QH**

MKT 1894 Honors Thesis **12 QH**

Logistics and Transportation

TRN 1333 The Transportation Industries **4 QH**
Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.

TRN 1335 Current Issues in Logistics and Transportation **4 QH**
Identifies important contemporary issues and problems in logistics and transportation and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.

TRN 1344 Business Logistics **4 QH**
Analyzes the role and activities of those involved in corporate logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems.

TRN 1352 Advanced Problems in Logistics and Transportation **4 QH**
Identifies and examines important logistics and transportation issues that are of strategic importance to logistics professionals and carrier managers. Emphasizes the decision-making processes employed by top-level executives in the field. Focuses on the policy formulation process.

TRN 1353 Seminar in Logistics and Transportation **4 QH**
Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government through individual research topics selected for class presentation/discussion. *Prereq. Senior standing or permission of instructor.*

TRN 1514 Carrier Management **4 QH**
Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection.

TRN 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

TRN 1592 Independent Study **2 QH**
Same as TRN 1591.

TRN 1593 Independent Study **3 QH**
Same as TRN 1591.

TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study **4 QH each**
Same as TRN 1591.

TRN 1760 Global Logistics **4 QH**
Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.

TRN 1891 Honors Thesis in Progress **0 QH**

TRN 1892 Honors Thesis **8 QH**

TRN 1893 Honors Thesis in Progress **0 QH**

TRN 1894 Honors Thesis **12 QH**

Computer Science

COM 1100 Fundamentals of Computer Science **4 QH**
Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses character strings and 1-dimensional arrays. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components. *Prereq. An interest in programming computers.*

COM 1101 Algorithms and Data Structures 1 **4 QH**
Introduces algorithms, data structures, abstraction, and encapsulation. Examines arrays, stacks, classes, and templates. Discusses the creation of a data structure in layers using composition of simpler components. Uses the concept of class and template to encapsulate the functions and operations on a data structure. Studies specific classes for arrays, stacks, queues, complex arithmetic, polynomials, and function objects. Introduces dynamic memory allocation for arrays and simple linked lists. Examines sorting and searching techniques and introduces recursion. *Prereq. COM 1100 or equivalent.*

COM 1102 Functional Programming and Its Applications **4 QH**
Introduces the fundamental concepts and applications of functional programming based on procedural and data abstraction. Discusses the relation between functional programming and symbolic processing as implemented in LISP-like languages. Covers simple applications selected from artificial intelligence, data-driven design, and programming language design and implementation. *Prereq. COM 1101.*

COM 1105 Computer Science and Its Applications **4 QH**
Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem-solving process. Discusses basic principles and provides hands-on experience with a word processor, a spreadsheet package, a database management system, and a presentation manager. *Not open to computer science or business administration majors.*

COM 1121 Computer Science Overview 1 **1 QH**
Introduces ideas and skills that are necessary for success in the computer science field. Examines the relation between personal goals and professional standards. Studies work habits, time management, organizational skills, interpersonal skills, and commitment. Raises issues of ethics and responsibility. Discusses thinking skills that are needed in computer science and introduces problem-solving exercises designed to develop these skills. Introduces readings from the software literature to illustrate the variety of skills needed in industry. *Prereq. Computer science majors only.*

COM 1122 Computer Science Overview 2 **1 QH**
Introduces the UNIX operating system, the Internet, and other important systems. Discusses their basic concepts and history. Introduces ethical issues such as privacy, security, reliability, and intellectual property. *Prereq. Computer science majors only.*

COM 1130 Computer Organization and Design **4 QH**
Discusses how a computer system works and why it performs as it does. Topics include assembly language (programs, call/return, stack frames), arithmetic (representations and algorithms), digital design (implementation of an RISC subset), and organization (memory hierarchy). *Prereq. COM 1101 or permission of instructor.*

COM 1201 Algorithms and Data Structures 2 **4 QH**
Continues the study of algorithms, data structures, abstraction, and encapsulation. Introduces structures that utilize arrays and/or links in more sophisticated ways. Studies linked lists, trees, heaps, priority queues, and hashing. Discusses efficient sorting (quicksort and heapsort) and introduces experimental analysis or algorithms. Examines several design issues, including selection of structures based on what operations need to be optimized (insertion, deletion, traversal, searching, sorting, evaluation), encapsulation of algorithms using class and template techniques, and how and when to use recursion (versus explicit stack-based techniques). Introduces graph algorithms and structures if time permits. *Prereq. COM 1101 or equivalent.*

COM 1204 Object-Oriented Design **4 QH**
Introduces the philosophy and methodology of object-oriented software design and the techniques of object-oriented programming. Discusses the design and implementation of individual classes and the tradeoffs in designing collections of classes. Introduces class libraries and application frameworks. Examines simple design patterns and compares object-oriented design to other software design paradigms. Applies object-oriented design to several medium-sized projects. *Prereq. COM 1201 or permission of instructor.*

COM 1205 Software Design and Development **4 QH**
Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq. COM 1201, COM 1204.*

COM 1230 Introduction to UNIX Tools **4 QH**
Introduces the essentials of UNIX tool programming (with a bent toward systems administration) via the use of high-level programming languages, utilities, and toolkits. Topics include UNIX shells and essential utilities, Perl, Tcl/Tk, system and network security issues, and high-level networking and protocol basics. Provides students with an opportunity to learn the tools and programming languages that will help them make the best use of UNIX (and the myriad other operating systems where the tools have been ported). *This course does not qualify as a computer science elective, but computer science majors may take this course as a free elective.*

COM 1315 Database Design **4 QH**
Focuses on the use and properties of relational database management systems. Uses the entity-relationship model on example problems. Presents the SQL language. Topics may include indexing, query optimization, and object-oriented databases. Requires implementing a database schema and writing a short application program on a commercial database management system. *Prereq. COM 1101 or programming experience in a high-level language. Nonmajors with programming experience in C are welcome.*

COM 1317 Transaction Processing Systems **4 QH**
Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall

architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq. COM 1130, COM 1201, and COM 1315.*

COM 1330 Operating Systems **4 QH**
Introduces the basic concepts underlying computer operating systems and provides hands-on experience with their implementation. Covers the basic structure of an operating system: hardware and application interfaces, processes, threads, synchronization, interprocess communication, processor allocation, deadlocks, memory management, file systems, and input/output control. Uses examples from many real operating systems (UNIX, MS-DOS, Windows NT) to reinforce concepts. *Prereq. COM 1130 and COM 1201.*

COM 1335 Distributed Operating Systems **4 QH**
Covers distributed operating systems; communication: ATM, client-server, remote procedure call; processors, processes, and threads; distributed file systems; security. Uses case studies. Includes programming on workstations in labs. *Prereq. COM 1330.*

COM 1337 Computer Communication Networks **4 QH**
Introduces the underlying concepts and principles of computer networks. Presents the different components of a network and how these components fit together. Emphasizes the design and implementation of network software that transforms raw hardware into a richly functional communication system. Real networks (such as the Internet, ATM, Ethernet, Token Ring) will be used as examples to reinforce the concepts and demonstrate various protocols. Also covers applications such as electronic mail and the World Wide Web. Topics include introduction to communications connectivity and standards; layered architectures; ISO/OSI and TCP/IP reference models; data transmission, synchronization, and multiplexing; error handling, link control, and protocol operations; local area networks; network interconnection; high-speed networks; wide area networks; internetworking; transport layer services; and higher layers and applications. *Prereq. COM 1330.*

COM 1350 Automata and Formal Languages **4 QH**
Covers finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; Turing machines, Church's thesis, and the halting problem; and applications to compilers, artificial intelligence, and pattern recognition. *Prereq. COM 1201 and MTH 1137.*

COM 1355 Compiler Design 1 **4 QH**
Implements lexical analyzers and parsers as specified by regular expressions and context-free grammars. Emphasizes the use of LALR(1) or LL(1) parser generators. Covers basic code generation. Uses a hands-on approach, including either a sequence of programming assignments or a project. *Prereq. COM 1130 and COM 1350.*

COM 1358 Analysis of Programming Languages **4 QH**
Covers run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq. COM 1102 and COM 1350.*

COM 1370 Computer Graphics **4 QH**
Focuses on characteristics and programming of graphics output devices. Presents basic point and line drawing, two-dimensional displays; clipping and windowing. Surveys pictures; data structures and display file organization; and interaction; graphical input and event-driven programs. Includes some three-dimensional drawing. *Prereq. COM 1201 and MTH 1301.*

COM 1390 Algorithms **4 QH**
Introduces the basic principles and techniques for the discovery, design, analysis, and implementation of efficient algorithms. Sample algorithms will be drawn from sorting and searching, graph algorithms, string matching algorithms, greedy algorithms, and dynamic programming. Analysis will use both theoretical and experimental techniques. The course will conclude with a discussion of "hard problems" for which no efficient algorithms are known and will introduce the concept of NP-complete problems. *Prereq. COM 1350.*

COM 1400 Data Parallel Computing **4 QH**
Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines (with mesh or hypercube interconnections) and networks of workstations. Studies fundamental data structures and data parallel algorithms for matrix operations and fast fourier transforms. Examines graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments. *Prereq. COM 1390, MTH 1125, and MTH 1301.*

COM 1410 Artificial Intelligence **4 QH**
Focuses on approaches to making computers act intelligently by studying current methods for automated understanding, problem solving, optimal search, knowledge representation, vision, and learning. Students perform experiments with semantic nets, logical deduction systems, evidential reasoning systems, and/or neural nets. *Prereq. COM 1102, COM 1201.*

COM 1420 Principles and Methods in Interactive Systems Design **4 QH**
Introduces principles of human-computer interface design and methodologies of implementation, evaluation, and research in human-computer interaction. Topics include user psychology, dialog styles (menus/controls, command languages, icons, windows); screen layout and design, input devices (mouse, touch-screen, keyboard, voice); error handling and reporting; system response time; user documentation and help systems; and "intelligent" interfaces. Discusses techniques for the implementation and usability testing of human-computer interfaces. *Prereq. COM 1204 and COM 1370.*

COM 1621 Computer Science Seminar **1 QH**
Prepares students in methods of oral presentation of a topic in computer science. Describes techniques in preparation of overheads and other visual aids and their appropriate and effective use. Requires students to give a 20–30 minute oral presentation with overheads on a topic of their choice. *Prereq. Computer science seniors only.*

COM 1721, COM 1722, COM 1723 **1 QH each**
Freshman Honors Seminar 1, 2, and 3
Offers a seminar course for freshman honors students in com-

puter science and for freshman honors students in other majors who are concurrently taking COM 1100, COM 1101, or COM 1201 respectively, or who have completed these courses. Introduces a variety of topics that extend the material in the standard freshman computer science courses or go beyond the scope of these courses. *Prereq. Enrollment in the honors program or permission of the instructor.*

COM 1770 Computer Science Seminar (Honors) 4 QH
Offers a capstone course for computer science honors students. Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic. *Prereq. Computer science seniors in the honors program or permission of instructor.*

COM 1777 Honors Adjunct Computer Science 1 QH
Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science 4 QH
Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. *Prereq. Permission of the instructor; may be repeated for credit.*

COM 1810 Topics in Computer Science 4 QH
Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq. Permission of the instructor.*

Cooperative Education

COP 1135 Professional Development for Journalists **1 QH**
Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self exploration.

COP 1180 Career Decision-Making **4 QH**
Focuses on needs and concerns of students who are undecided or uncertain about their academic major or career direction. Students will identify their work values, interests, skills and personality preferences as these relate to choice of major and career options. Provides students with the opportunity to explore various careers through researching in the Career Resource Center, conducting informational interviews with professionals in their fields of interest, and using the Internet. Discusses how labor market trends and workplace issues impact career choice. Emphasizes decision-making and goal setting strategies. *Prereq. Freshmen or sophomores in any major or permission of instructor.*

COP 1220 Working in the United States **4 QH**
Helps international students compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural issues, the American work ethic, skills development, résumé writing, and interviewing techniques. *Prereq. International students prior to first co-op experience or permission of instructors.*

COP 1314 Life/Career Planning **4 QH**
Assists students with the transition from school to the workplace. Students identify their career interests and values, and assess skills and personality preferences to help them make better career decisions. Emphasizes labor market issues, job search techniques, networking and career management strategies. Prepares students for the job search process by requiring them to complete a professional résumé, participate in videotaped mock interviews, and research companies. *Prereq. Junior or senior standing or permission of instructor.*

COP 1350 Pharmacy Co-op Seminar 1 **1 QH**
Introduces and prepares the pharmacy student for the experiential component of the pharmacy curriculum. Introduces the student to policies and procedures of the Department of Cooperative Education. Provides students with the opportunity to develop the skills necessary to be successful in the preparation, activity, and reflection components of the cooperative education curriculum. Offers students the opportunity to gain an understanding of the various opportunities that are available to them in the profession of pharmacy.

COP 1353 Professional Development for Education **1 QH**
Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and utilizes advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the role of the teachers' union, teacher certification and graduate school, career issues for women, and alternative careers in education.

COP 1370 Introduction to Nursing Career Management **1 QH**
Students will have an opportunity to identify skills; develop job-finding, job-survival, and career management skills; and learn about the nursing co-op program.

COP 1390 Community Service Learning **4 QH**
Provides an introduction to service learning methodology as a way of teaching and learning for lifelong exploration of questions of civic responsibility, multicultural perspectives, societal norms, individual/group empowerment, and values clarification. Students will have the opportunity to explore the relationship of community service to academic study and career decision making.

Criminal Justice

CJ 1101 Administration of Criminal Justice **4 QH**
Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1001, CJ 1002 Critical Issues in Criminal Justice 1 and 2 **4 QH each**
Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process 1 **4 QH**
Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2 **4 QH**
Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq. CJ 1151 and CJ 1252.*

CJ 1201 Criminology **4 QH**
Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law **4 QH**
Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process **4 QH**
Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq. CJ 1251.*

CJ 1253 Introduction to Criminal Courts **4 QH**
Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq. CJ 1251 and CJ 1252.*

CJ 1254 Civil Liability in Criminal Justice **4 QH**
Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq. CJ 1251 and CJ 1252.*

CJ 1255 Introduction to Juvenile Law **4 QH**
Introduces the way society responds to juvenile offenders. Topics studied may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court. *Prereq. HCJ 1252 and junior or senior only.*

CJ 1301 Introduction to Security **4 QH**
Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1302 Theories of Investigation **4 QH**
Examines the commonalities and differences between criminal and non-criminal investigations, using various sources of information, and legal constraints imposed on investigators. Studies how forensics helps investigators in criminal investigations. Discusses interviewing techniques, report writing, and giving testimony.

CJ 1311 White-Collar Crime **4 QH**
Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the inter-agency and jurisdictional problems and the benefits of cooperation.

CJ 1312 Organized Crime **4 QH**
Examines the myths and realities of what is termed organized crime. Discusses the nature of organized crime and factors that contribute to it, as well as measures taken by society to curb its activities. Addresses the impact of organized crime on American society and its implications, both economic and political. Analyzes the characteristics of organized criminal enterprises and the variety of such groups operating in the United States as well as on the international level.

CJ 1314 Security Management and Supervision **4 QH**
Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq. CJ 1301 or equivalent.*

CJ 1318 Terrorism **4 QH**
Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations **4 QH**
Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security man-

agement concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1401 Police Administration and Management **4 QH**
Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to policing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.

CJ 1411 Police Strategy **4 QH**
Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq. CJ 1401.*

CJ 1424 Seminar in Policing **4 QH**
Specific topic in policing to be announced. *Prereq. CJ 1401, CJ 1411, and junior standing or above.*

CJ 1426 Topics in Policing **4 QH**
Specific topic in policing to be announced. *Prereq. Junior standing or above.*

CJ 1427, CJ 1428, CJ 1429, CJ 1430 Topics in Criminal Justice **4 QH each**
Specific topics in criminal justice to be announced. *Prereq. Middler standing or above.*

CJ 1453 Criminal Justice Research Methods **4 QH**
Examines basic concepts in conducting criminal justice research. Students will become familiar with research techniques that are necessary for systematic analysis of the criminal justice system, offenders' behavior, crime trends, program effectiveness, problem analysis, etc. Requires that students actively pursue such techniques as research interviewing, data coding, and preliminary analysis in and outside of class. *Prereq. MTH 1010 or equivalent.*

CJ 1454 Criminal Justice Statistics **4 QH**
Focuses on the use of statistics with special emphasis on criminal justice applications and the analysis of criminal justice data. Covers basic descriptive statistics, including levels of measurement, measures of central tendency, and measures of variability. Introduces the student to inferential statistics, including the normal curve, sampling error and confidence intervals, hypothesis testing, chi-square, and correlation. *Prereq. HCJ 1453.*

CJ 1511 Survey of Criminal Evidence **4 QH**
Focuses upon the fundamentals of criminal trial procedure and the rules of evidence as they apply to the trial of a criminal case. Students are required to read and brief criminal court cases. *Prereq. CJ 1251 and CJ 1252.*

CJ 1512 Seminar in Law and Criminal Justice **4 QH**
Specific topic in the law and criminal justice to be announced. *Prereq. CJ 1251, CJ 1252, and junior or senior standing.*

CJ 1513 Criminal Homicide **4 QH**
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.

CJ 1601 Survey of Correctional Systems **4 QH**
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq. CJ 1201.*

CJ 1612 Juvenile Justice **4 QH**
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq. SOC 1100 and CJ 1201.*

CJ 1613 Probation and Parole **4 QH**
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq. CJ 1601.*

CJ 1615 Crime and Criminal Justice: A Comparative View **4 QH**
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq. CJ 1101, SOC 1100, or equivalent.*

CJ 1616 Women and the Criminal Justice System **4 QH**
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq. Middler standing or above.*

CJ 1618 Victims of Crime **4 QH**
Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1621 Incarceration **4 QH**
Offers in-depth familiarity with key reading in the history and sociology of incarceration. Topics include theories of incarceration; sentence determination; history of our incarceration systems; inmate and staff perspectives on incarceration; and special category inmates (mentally ill, rape victims, death row prisoners). Includes extensive discussion. *Prereq. CJ 1301, middler standing or above, and QPA over B–; or permission of instructor.*

CJ 1622 Alternatives to Incarceration **4 QH**
Explores what is now known about sentencing models used throughout the United States and assesses how well they fulfill societal demands for incapacitation, retribution, and deterrence. Compares substantive differences in various forms of punishment, including intermediate sanctions such as house arrest and electronic monitoring. Examines process issues such as choosing appropriate target populations and decision points where intermediate sanctions may be used. *Prereq. Junior or senior status.*

CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study **4 QH each**

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 **4 QH**
Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq. CHM 1132 and CHM 1138; CHE 1205 taken concurrently.*

CHE 1202 Chemical Engineering Calculations 2 **4 QH**
Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq. CHE 1201.*

CHE 1205 Computation Laboratory **2 QH**
Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq. CHE 1201 taken concurrently.*

CHE 1211 Chemical Engineering Thermodynamics 1 **4 QH**
Covers the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq. CHE 1201 and CHE 1205.*

CHE 1310 Chemical Engineering Thermodynamics 2 **4 QH**
Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq. CHE 1211.*

CHE 1321 Momentum Transport **5 QH**
Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq. CHE 1211 and CHE 1202.*

CHE 1415 Experimental Methods 1 **5 QH**
Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data handling techniques. Lab fee. *Prereq. CHE 1321 and ENG 1125.*

CHE 1416 Experimental Methods 2 **5 QH**
Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq. CHE 1415 and ENG 1125.*

CHE 1421 Chemical Engineering Kinetics **4 QH**
Covers fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq. CHE 1310.*

CHE 1431 Heat Transport **5 QH**
Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq. CHE 1321.*

CHE 1441 Separation Processes **5 QH**
Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq. CHE 1431.*

CHE 1450 Chemical Engineering Economics **4 QH**
Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq. ECN 1115.*

CHE 1501 Chemical Process Design 1 **6 QH**
Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq. CHE 1421 and CHE 1441.*

CHE 1502 Chemical Process Design 2 **6 QH**
Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq. CHE 1501.*

CHE 1503 Projects 1 **6 QH**
Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq. Senior standing and permission of department.*

CHE 1504 Projects 2 **6 QH**
Continues the research work begun in CHE 1503. Lab fee. *Prereq. CHE 1503.*

CHE 1511 Mathematical Methods in Chemical Engineering **4 QH**
Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced

mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1512 Chemical Process Control **4 QH**
Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq. Senior standing.*

CHE 1514 Special Topics **4 QH**
Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq. Senior standing.*

CHE 1516 Mass Transfer Operations **4 QH**
Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1519 Polymer Science **4 QH**
Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq. CHE 1421 and CHM 1272; Advanced Chemistry elective.*

CHE 1520 Pollution Control in Chemical Industries **4 QH**
Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1524 Chemical Process Safety **4 QH**
Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1530 Biochemical Engineering Fundamentals **4 QH**
Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course. *Prereq. Permission of department.*

CHE 1796 Honors Project 1 **4 QH**
Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq. Permission of department.*

CHE 1797 Honors Project 2 **4 QH**
Continues CHE 1796. *Prereq. CHE 1796.*

Civil and Environmental Engineering

CIV 1210 Structural Mechanics 1 **4 QH**
Covers statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq. MTH 1223 taken concurrently and PHY 1222.*

CIV 1211 Structural Mechanics 2 **4 QH**
Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq. CIV 1210.*

CIV 1220 Structural Analysis 1 **4 QH**
Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq. CIV 1211.*

CIV 1222 Structural Analysis 2 **4 QH**
Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq. CIV 1220, CIV 1226, and MTH 1230.*

CIV 1226 Structural Analysis and Design Laboratory **2 QH**
Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq. CIV 1220 taken concurrently.*

CIV 1240 Concrete Design 1 **4 QH**
Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq. CIV 1220.*

CIV 1241 Concrete Design 2 **4 QH**
Covers various topics including design of slender columns, foundations, and multistory buildings with one-way and two-way floor systems. *Prereq. CIV 1240.*

CIV 1245 Advanced Structural Design **4 QH**
Continues concrete and steel design. Topics in concrete design include columns with axial loads and bending moments, biaxial bending, and slenderness effects; footings to support walls and columns; prestressed concrete fundamentals. Topics in steel design include bolted and welded connections with tension, shear, combined tension and shear, and eccentric shear; framed beam connections; beam-to-column moment connections; composite columns with combined bending and axial load; composite beams with full and partial composite action. *Prereq. CIV 1240 and CIV 1250.*

CIV 1250 Steel Design 1 **4 QH**
Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq. CIV 1220 taken concurrently.*

CIV 1251 Steel Design 2 **4 QH**
Discusses topics including design of steel plate girders, composite construction in bridges and buildings, plastic analysis and design, and the design of high-rise buildings subject to lateral loads. *Prereq. CIV 1250.*

CIV 1295 Structural Design Projects **4 QH**
Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq. CIV 1240 and CIV 1250; CIV 1241 or CIV 1251 or CIV 1245; and senior standing. CIV 1222 taken concurrently.*

CIV 1310 Fluid Mechanics **4 QH**
Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq. CIV 1210.*

CIV 1320 Hydraulic Engineering **4 QH**
Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq. CIV 1310.*

CIV 1340 Environmental Engineering 1 **4 QH**
Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq. CHM 1132.*

CIV 1341 Environmental Engineering 2 **4 QH**
Concentrates on unit operations, unit processes, and related fundamental design of physical, chemical, and biological water and wastewater treatment systems. Typical topics include aeration systems, activated sludge, fixed film biological treatment, gas transfer, reaction kinetics, reactor modeling, sedimentation, filtration, and subsurface disposal system design. *Prereq. CIV 1310 and CIV 1340.*

CIV 1350 Environmental and Hydraulics Design Laboratory **4 QH**
Presents lectures and laboratory experiments in the areas of hydraulic and environmental engineering. Laboratory experiments have related design projects that will allow the student to investigate a unit operation or process in some depth. Topic areas covered include several of the following: wastewater neutralization, biological treatment, coagulation, oxygen demand, oxygen transfer, sedimentation, weirs, pumps, ion exchange, carbon absorption, and disinfection. *Prereq. CIV 1320 taken concurrently and CIV 1340.*

CIV 1370 Air Pollution **4 QH**
Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq. Junior standing.*

CIV 1395 Environmental Design Projects **4 QH**
Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq. CIV 1320, CIV 1341, CIV 1350, and senior standing.*

CIV 1410 Soil Mechanics **4 QH**
Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq. CIV 1211; CIV 1310 taken concurrently.*

CIV 1411 Soil Mechanics Laboratory **2 QH**
Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq. CIV 1410 taken concurrently.*

CIV 1420 Foundation Engineering **4 QH**
Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq. CIV 1410.*

CIV 1495 Geotechnical Design Projects **4 QH**
Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq. CIV 1420 and senior standing.*

CIV 1510 Materials **4 QH**
Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq. CHM 1131.*

CIV 1511 Materials Laboratory **2 QH**
Uses standard tests and equipment in the lab to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, and others. *Prereq. CIV 1510 taken concurrently.*

CIV 1530 Transportation Analysis and Planning **4 QH**
Studies the analysis and demand prediction for urban passenger transportation and travel demand forecasting by the traditional four-step method and other methods. Discusses impact assessment, including traffic, environmental, and economic impacts. Topics also include the history of urban transportation and analysis of current policy issues. *Prereq. MTH 1123.*

CIV 1540 Highway Engineering **4 QH**
Presents an overview of highway engineering, including route selection, geometric design, pavement design, drainage, construction, and maintenance. Discusses highway administration, financing, costs, planning and the environmental impact process, and traffic engineering fundamentals for highways. *Prereq. CIV 1620.*

CIV 1550 Construction Management **4 QH**
Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq. Junior standing.*

CIV 1595 Transportation Design Projects **4 QH**
Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq. CIV 1530, CIV 1540, CIV 1630 taken concurrently, CIV 1640, and senior standing.*

CIV 1620 Engineering Measurements **4 QH**
Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq. MTH 1124 and PHY 1221.*

CIV 1621 Engineering Measurements Laboratory **2 QH**
Examines field problems illustrating and applying the lecture material in CIV 1620 with computer applications. *Prereq. CIV 1620 taken concurrently.*

CIV 1640 Applied Probability Theory for Civil Engineers **4 QH**
Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq. MTH 1223.*

CIV 1650 Legal Aspects of Civil Engineering **4 QH**
Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq. Junior standing.*

CIV 1665 Professional Issues for Civil Engineers **1 QH**
Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration. *Prereq. Junior standing.*

CIV 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors) **4 QH**
Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

CIV 1797 Independent Study/Research 2 (Honors) **4 QH**
Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq. CIV 1796.*

CIV 1810 Special Topic in Civil Engineering **4 QH**
This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq. Permission of instructor.*

CIV 1820 Special Project in Civil Engineering **4 QH**
Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq. Outstanding academic performance.*

CIV 1821 Special Project in Civil Engineering **2 QH**
For students wishing to spread an independent project over two quarters. Taking CIV 1821 twice is equivalent to taking CIV 1820. Can be taken over two quarters, with students registering for each quarter.

Electrical Engineering

ECE 1171 Electrical Engineering 1 **4 QH**
Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff's laws. Discusses selected topics that illustrate the variety of applications of electrical engineering, such as AC circuits and electric

power, the basics of semiconductor devices with application to transistor amplifier models, transients in circuits with energy storage, digital signals, logic circuits, and some basic concepts of computer operation, specifically number coding, arithmetic operations, and memory circuits. *Prereq. MTH 1125; not open to electrical engineering majors.*

ECE 1178 Digital Electronics for Computer Science Majors **4 QH**
Introduces electronic digital circuits preparing computer science majors for ECE 1382. Starts with the basics of electronic circuit analysis and continues with the principles of MOS and bipolar semiconductors and their applications to logic gate circuits. Discusses logic circuit design supplemented by hardware considerations: level tolerance, power dissipation, gate, and component count. Introduces circuits with RC time constants to explain delays and speed limitations of logic circuits. Describes basic logic array circuits with application to ROM and PROM. *Not open to electrical engineering majors.*

ECE 1215 Circuits 1 **4 QH**
Introduces the basic laws and the basic signal and device models used in the study of linear circuits. Topics include Kirchhoff's Laws and Tellegen's Theorem, node-voltage and mesh-current analysis, circuit reduction, and the Thevenin and Norton Theorems. Introduces three-terminal and dependent source models, with extensive coverage of the ideal operational amplifier model. Discusses various common signal models, including step functions, exponentials, sinusoids, first- and second-order circuits and the solution of the related differential equations. *Prereq. ECE 1240, MTH 1125, MTH 1225 and PHY 1223. (MTH 1225 may be taken concurrently.) ECE 1241 must be taken concurrently.*

ECE 1226 Discrete Systems Laboratory **1 QH**
Consists of four experiments that are closely integrated with the ECE 1333 course lectures. The first two experiments are concerned with A/D aliasing and quantization, the third with gain and phase-shift, and the fourth with the Discrete-Time Fourier Transform. *ECE 1333 must be taken concurrently.*

ECE 1227 Electromagnetic Fields Laboratory **1 QH**
Supports class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line electrical length measurement; reflection and impedance measurements of dipole antenna; frequency characteristics of antennas and waveguides; antenna mutual coupling; and radiation pattern determination. *ECE 1364 must be taken concurrently.*

ECE 1228 Energy Devices Laboratory **1 QH**
Investigates transformers and DC machines; conducts tests to model the energy device and evaluate its load characteristics, thereby supporting the theory learned in ECE 1370. *ECE 1370 must be taken concurrently.*

ECE 1229 Digital Systems Laboratory **1 QH**
Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as a parallel binary divider or digital calculator. Covers the use of a field programmable gate array for implementing the design. *ECE 1382 must be taken concurrently.*

ECE 1230 VLSI System Design Laboratory **2 QH**
Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Designs can be sent to MOSIS for fabrication. *ECE 1351 must be taken concurrently.*

ECE 1231 Power Systems Laboratory **1 QH**
Applies techniques covered in ECE 1472, addressing topics such as transmission line constants, load flow and short-circuit studies, and transient stability. Includes upgrading the design of a small power system. *ECE 1472 must be taken concurrently.*

ECE 1232 Electric Machines Laboratory **2 QH**
Investigates topics in electromechanical energy conversion employing Faraday's Law Machine Bench. Studies steady-state and transient-state behavior of induction, synchronous, and DC machines. *ECE 1371 must be taken concurrently.*

ECE 1233 Semiconductor Processing Laboratory **2 QH**
Covers fabrication and testing of MOS integrated circuits. Students compare process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Lab work includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated integrated circuits will be electrically characterized. *ECE 1406 must be taken concurrently.*

ECE 1234 Digital Signal Processing Laboratory **2 QH**
Focuses on practical aspects of DSP by programming a digital signal processing chip in its native assembly language. Topics include, but are not limited to, input/output operations via A/D and D/A converters, digital frequency synthesis, computation of discrete time convolution, and design and implementation of both FIR and IIR digital filters. *ECE 1456 must be taken concurrently.*

ECE 1235 Control Systems Laboratory **1 QH**
Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog computer simulation, digital computer control, and use of CAD packages such at MATLAB for analysis and design of control systems. Experiments with PID control emphasize classical methods of feedback compensation, and an experiment with modern techniques of state variable feedback considers digital speed control of a DC motor. *ECE 1420 must be taken concurrently.*

ECE 1238 Microprocessor Laboratory **2 QH**
Provides students with the opportunity to practice the theory being learned concurrently in ECE 1383. Consists of four laboratory exercises and a small project executed by groups of three students using a modern single-board computer and associated test and development equipment. Exercises cover topics including memory expansion, memory testing, I/O hardware and I/O drivers, and interrupt driver control. Requires students to integrate software and hardware to make the system perform some complete task.

ECE 1240 Introduction to Electrical Engineering Laboratory **1 QH**
Provides a hands-on introduction to electronic circuits, devices, and measurement techniques. Students will design, assemble, and test a wireless switch for remote control of household appliances. Develops this system using an infrared (IR) diode transmitter, a light sensitive phototransistor receiver and additional digital and analog interface circuitry. Uses the switch to remotely control a household appliance, such as a lamp or radio, using an electromechanical relay. *Prereq. GE 1101, PHY 1223.*

ECE 1241 Circuits Laboratory **1 QH**
Covers experiments reinforcing basic circuit theory topics such as equivalent circuits, voltage/current divider applications, potentiometers or the Wheatstone bridge, experimental verification of network theorems, operational amplifier behavior, and/or response of RL, RC, and RLC circuits. *Prereq. ECE 1240, MTH 1125, MTH 1225. ECE 1215 must be taken concurrently.*

ECE 1242 Electronics Laboratory 1 **1 QH**
Includes experiments such as characterization of diodes, BJTs, and mosfets. Allows students to design such circuits as multistage amplifiers and photoswitches. *ECE 1341 must be taken concurrently.*

ECE 1243 Electronics Laboratory 2 **1 QH**
Includes experiments using integrated circuit current mirrors, differential amplifiers, frequency response, and feedback. *ECE 1342 must be taken concurrently.*

ECE 1246 Circuits 2 **4 QH**
Presents the unilateral Laplace transform as a technique for solving differential equations with initial conditions that model linear circuit behavior, followed by the introduction of Laplace transform equivalent circuit models. Uses s-domain analysis for the solution of linear circuit problems, including node-voltage and mesh-current methods. Covers several topics connected to the use of network functions including pole/zero plots, frequency response, and a brief treatment of the synthesis of circuits to match given transfer functions. Considers circuits in the sinusoidal steady-state, first introducing phasor representations, then applying phasors to analyze resonance, ideal and linear transformers, and complex power and three-phase systems. *Prereq. ECE 1215.*

ECE 1308 Physical Electronics **4 QH**
Develops elements of solid-state theory including crystal structure, quantum theory of the atom, and carrier (electron and hole) transport theory. Uses this knowledge to explore devices commonly used in modern electronic circuits, including p-n junction diodes, Schottky barrier diodes, MOS transistors, and bipolar junction transistors. Designed to provide the preparation for advanced study in the areas of integrated circuit fabrication, VLSI design, and electronic design. *Prereq. ECE 1342.*

ECE 1332 Linear Systems 1 **4 QH**
Discusses continuous systems first from the time domain viewpoint and then from the frequency domain viewpoint. Begins the time domain presentation with a general discussion of systems as a mapping followed by a discussion of time-invariance. Presents linear time-invariant system theory in detail including topics such as convolution, causality, stability, system interconnections, and the system sinusoidal response. Begins the frequency domain presentation with a discussion of the Fourier transform as a basis for the development of the bilateral Laplace transform and the s-plane. Discusses the Fourier and Laplace transforms and their properties, and develops, in terms of these transforms, system aspects such as causality, stability, and the system analysis. Uses the s-plane viewpoint to study the stability of feedback systems and the system gain and phase-shift. *Prereq. ECE 1246 and MTH 1225.*

ECE 1333 Linear Systems 2 **4 QH**
Begins with an analysis of A/D and D/A conversion, and includes aliasing ideal D/A conversion, and A/D quantization. Discusses the analysis and realization of linear shift-invariant discrete systems. System concepts taught in ECE 1332 provide the basis for development. Presentation includes such topics as convolution, causality, stability, system interconnections, and the system sinusoidal response. This motivates a presentation of Discrete-Time Fourier Series, the Discrete-Time Fourier Transform, and the Z-Transform. Discusses system aspects such as causality, stability, and system analysis in terms of this transform. Lastly, the z-plane analysis of gain and phase-shift is presented. *Prereq. ECE 1332. ECE 1226 must be taken concurrently.*

ECE 1341 Electronics 1 **4 QH**
Introduces the analysis and design of modern electronic circuits, as well as the operation of the principal semiconductor devices: diodes, field-effect transistors, and bipolar junction transistors. Focuses on using large- and small-signal semiconductor device models to understand the operation of single stage amplifiers and logic gates. *Prereq. ECE 1215; ECE 1242 must be taken concurrently.*

ECE 1342 Electronics 2 **4 QH**
Develops the analysis techniques required to design analog circuit functions, primarily amplifiers. Discusses feedback, frequency response, stability, and compensation. Addresses topics such as biasing, single and compound amplifier stages, feedback amplifiers including impedance, Nyquist's stability criterion, and compensation of feedback amplifiers. *Prereq. ECE 1246 and ECE 1341; ECE 1243 must be taken concurrently.*

ECE 1343 Electronic Design 1 **4 QH**
Develops analysis and design techniques for digital and mixed analog/digital circuits. Recommended for students interested in working in the integrated circuit industry, or with electronic hardware. Examines CMOS and ECL logic families, multivibrators, Schmitt triggers and comparators, pulse generators, sample and hold circuits, and D/A and A/D converters. *Prereq. ECE 1342.*

ECE 1344 Electronic Design 2 **4 QH**
Extends the concepts of Electronics 2 and Electronic Design 1 to a variety of signal processing circuits. Requires students to do at least three major circuit designs, which may include the following: active filters, analog multipliers, saw-tooth generators, sinusoidal oscillators, switching power supplies, and electronic sensors. *Prereq. ECE 1343.*

ECE 1351 Special Topics in IC Design **4 QH**
Offers a structured digital MOS design course in designing, verifying, and fabricating CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RC delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq. ECE 1382; ECE 1230 must be taken concurrently.*

ECE 1355 Communication Systems 1 **4 QH**
Introduces basic concepts of digital communication in additive white Gaussian noise (AWGN) channels. Reviews Fourier transform and Fourier Series representation of signals and introduces random processes. Examines power spectrum density, geometric representation of signals and signal spaces, concepts of information sources and source coding algorithms, principles of optimum receiver design for AWGN channels, correlation and matched filter receivers, and probability of error analysis for binary and M-ary signaling through AWGN channels, digital PAM transmission through band-limited AWGN channels, zero ISI condition, system design in the presence of channel distortion, design of optimum transmitting and receiving filters, channel equalization, introduction to digital transmission via carrier modulation. *Prereq. MTH 1384 and ECE 1333.*

ECE 1363 Electromagnetic Fields 1 **4 QH**
Develops the fundamental equations of electromagnetics and presents applications. Introduces the mathematics necessary for electromagnetics: complex vector phasors and vector calculus. Defines the electromagnetic field with the Lorentz force equation. Presents and applies Coulomb's and Biot-Savart's laws. Explains the macroscopic constitutive relations. Formulates Maxwell's equations in both integral and differential form. Develops Poynting's theorem. Presents the principles for the operation of generators and motors. Derives the wave equation and studies the uniform plane wave solution in both time and frequency domain. Concludes with the reflection and transmission of plane waves. *Prereq. MTH 1223, MTH 1225, and PHY 1223.*

ECE 1364 Electromagnetic Fields 2 **4 QH**
Studies electrodynamic applications of electromagnetic field theory: lossless transmission lines, waveguides, optical fibers, and antennas. Develops transmission line theory by use of distributed circuit elements and introduces the TEM waves. Obtains solutions analytically and also graphically using the Smith Chart. Seeks TM and TE solutions for parallel-plate waveguides and general rectangular metal waveguides. Examines optical fibers after a study of uniform plane wave refraction. Investigates the radiation properties of electric dipoles and studies the enhancement of directivity using phased arrays. *Prereq. ECE 1363; ECE 1227 must be taken concurrently.*

ECE 1366 Computational Electromagnetics **4 QH**
Presents numerical and computational approaches to electromagnetic field problems, as well as engineering applications. Gives students the opportunity to use software environments such as Matlab to implement the various algorithms for solution and to present graphical results. Begins with an introduction to computation methods and linear algebra. Uses the finite difference method approach for solving the major partial differential equations of electromagnetics: Poisson's equation, the diffusion equation, and the wave equation. Also uses the FDTD approach to solve the wave equation. Presents the Rayleigh-Ritz method and the method of weighted residuals. Introduces integral equations as foundation for solving problems with the method of moments. Makes applications to the transmission lines, waveguides, resonators, antennas, and to antenna arrays. *Prereq. ECE 1364.*

ECE 1370 Electric Energy Devices **4 QH**
Reviews phasor diagrams and three-phase circuits, and presents magnetic aspects including magnetic circuits, energy storage, and permanent magnets. Includes other topics such as elements of transformers, principles of electromechanical energy conversion, and steady-state theory of induction, synchronous, and DC machines. *Prereq. 1246, ECE 1363; ECE 1228 must be taken concurrently.*

ECE 1371 Electric Drives and Motion Systems **4 QH**
Continues ECE 1370. Presents steady-state theory and performance of induction, synchronous, and DC machines. Investigates transients and dynamics of AC and DC machines. Introduces power semiconductor controlled drives. *Prereq. ECE 1370; ECE 1232 must be taken concurrently.*

ECE 1379 Analysis of Electrical Transients **4 QH**
Focuses on transient behavior where tools of linear, time-invariant analysis are inoperative. Draws examples from the power system and from computer interconnections. Studies topics and methods of broad interest in all of electrical engineering, exploring events such as communication over long and short transmission lines, circuit breaker action, transient recovery voltage, restrike, transient inrush current, geomagnetically induced currents, ferroresonance and capacitor flashover using piecewise-linear analysis techniques. Uses Matlab and Excel to attack real problems. Examines the real-world non-LTI behavior of transformers, transmission lines, circuit breakers, surge arresters, and lightning. Gives students the opportunity to do an analysis project, in which they model mathematically some transient event that they create in the lab or extract from the literature and then evaluate how well their mathematical model describes reality. *Prereq. ECE 1333 and ECE 1342.*

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture **4 QH**
Presents the visible architecture of a modern computer. Uses assembly language programming to develop a foundation on the hardware that executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq. GE 1101 or equivalent.*

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits **4 QH**
Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using state-of-the-art CAD tools to develop facility in the design and testing of functional digital circuits. *Prereq. ECE 1381; ECE 1229 must be taken concurrently.*

ECE 1383 Computer Engineering 3: Microprocessor-Based Design **4 QH**
Provides an introduction to both hardware and software issues in interfacing microprocessors to their local and outside worlds. Includes lab and lecture components to develop both analytical

understanding and design skills. Examines the following hardware items: bus characteristics, timing and protocols; memory organization; memory-mapped I/O; and interrupts. Studies complementary software topics including polling versus interrupt driven I/O and exception processing. *Prereq. ECE 1382; ECE 1238 must be taken concurrently.*

ECE 1384 Computer Engineering 4: Computer Organization and Design **4 QH**
Provides a coherent, structured overview of the current state of Computer Organization and Design. Studies the strategies for attaining high performance using the instruction set of a real architecture. Focuses on the forces that drive cost/performance decisions to achieve successful designs. Highlights design principles based on the interactions of hardware and software. Topics include performance metrics, machine language, processor data path and control path designs, pipelining, memory hierarchies, I/O devices and interfacing techniques, and parallel processing. Provides a deeper understanding of design and performance issues in laboratory exercises using software simulators. *Prereq. ECE 1383.*

ECE 1385 Computer Engineering 5: Introduction to Robotics **4 QH**
Teams two students together to design and implement a small mobile robot system to complete a specific task. Students compete their robots against robots built by other teams at the end of the course. Develops students' design capabilities of microprocessor controlled systems with input from sensory devices and output actuators. Topics include actuators, sensors, and system modeling. *Prereq. ECE 1333 and ECE 1383.*

ECE 1386 Computer Engineering 6: Data Structures, Algorithms, and Emerging Programming Models **4 QH**
Presents a survey of many common data structures and algorithms, all in the context of an object-oriented programming model. *Prereq. ECE 1381.*

ECE 1390 Senior Project Laboratory 1 **2 QH**
Allows students to work with a faculty adviser on a term project, either experimental or theoretical. *Prereq. Permission of department.*

ECE 1391 Senior Project Laboratory 2 **2 QH**
Continues the project started in ECE 1390 or it may be a new project. *Prereq. Permission of department.*

ECE 1400 Special Topics **4 QH**
Covers various topics from term to term depending on the interests of the department and the students. *Prereq. Permission of department.*

ECE 1406 Integrated Circuit Fabrication **4 QH**
Provides an overview of integrated circuit fabrication from the viewpoint of the process engineer. Focuses on the physics, chemistry, and technology of integrated circuit fabrication. Uses the industry-standard process simulator SUPREM-IV to supplement analytical process models. Expands on the semiconductor device background learned in ECE 1308. Reviews MOS operation and device models in conjunction with testing of the integrated circuit fabricated in the lab (ECE 1233). Concentrates on silicon IC technology, but also discusses other material systems and microstructures including GaAs and microsensors. *Prereq. ECE 1308; ECE 1233 must be taken concurrently.*

ECE 1420 Control Systems **4 QH**
Introduces the analysis and design of classical control systems and comprises closely coupled lectures and laboratory experiments. Examines control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, and stability of feedback systems. Also addresses analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq. ECE 1333 and ECE 1342; ECE 1235 must be taken concurrently.*

ECE 1455 Communication Systems 2 **4 QH**
Presents the state-of-the-art theory and techniques used in digital communication systems. Covers data compression techniques and rate-distortion theory, digital communication and system performance analysis in a variety of channel models, channel capacity, and coding for reliable communication, block and convolutional coding and decoding, trellis-coded modulation, direct sequence and frequency hopped spread spectrum systems. *Prereq. ECE 1355.*

ECE 1456 Digital Signal Processing **4 QH**
Introduces concepts in modern signal processing. Topics include review of discrete time signals and systems, discrete Fourier transform, realizations structures for digital filters, FIR filter design, IIR filter design, fast Fourier transforms, and applications to fast convolution. *Prereq. ECE 1333; ECE 1234 must be taken concurrently.*

ECE 1458 Communication Networks **4 QH**
Presents an overview of modern communication networks and basic principles of network design. Discusses types of traffic, multiplexing, and switching techniques. Uses layered network architectures, such as OSI (Open System Interconnection), and Internet and LAN (Local Area Network) architectures to explain the hierarchy of network functions. Studies data-link layer protocols including the commonly used Stop and Go, Go Back N and Selective repeat protocols. Propagation characteristics in optical cables are used for Physical layer study, including packet framing, synchronization, and error control. Discusses medium-access control (MAC) methods including the Aloha protocol used in packet radio networks, Carrier Sense Multiple Access, Ethernet and Fast Ethernet, Token Ring and Token Buss protocols, FDDI (Fiber Distributed Data Interface) and DQDB (Dual Queue Data Bus) protocols used in high-speed networks for local and metropolitan area networks. Addresses network layer functions of routing and congestion control. Analyzes routing algorithms based on flooding, shortest-path, and optimal routing. Introduces emerging techniques such as ATM (Asynchronous Transfer Mode) for use in the future Broadband ISDN (Integrated Service Data Network). *Prereq. MTH 1384 and ECE 1355.*

ECE 1463 Antennas **4 QH**
Introduces the fundamental principles of antenna theory. Applies these principles to the design and analysis of practical antennas for radar, broadcast, and wireless communication systems. Covers fundamental antenna parameters, radiation integrals and auxiliary potential functions, linear and loop antennas, antenna arrays, broadband dipoles and impedance matching techniques, traveling wave and broadband antennas, and frequency independent, aperture and reflector antennas. *Prereq. ECE 1364.*

ECE 1464 Microwave Networks **4 QH**
Focuses on advanced analytical, graphical, and matrix analyses of transmission lines and microwave networks. Covers analyses of lossy and lossless transmission lines, electrical scattering S-parameters, ferrite networks, microwave absorbers, and matrix representation of multiple connected networks. *Prereq. ECE 1364.*

ECE 1466 Modern Optics **4 QH**
Presents the basic optical concepts necessary for an understanding of current and future optical communication, remote sensing, industrial and biomedical systems. Topics include geometric optics, polarized light, diffraction, and interference. Studies lasers and other light sources, optical fibers, detectors, CDD cameras, modulators, and other components of optical systems. Presents applications to specific systems such as medical imaging systems, fiber-optic sensors, laser radars, and communication systems depending upon the interests of the class. *Prereq. ECE 1364.*

ECE 1471 Elements of Power Systems **4 QH**
Introduces electric power systems. Examines steady-state balanced three-phase systems, transmission line constants and system modeling, transmission line equations and line power limitations, and three-phase transformers. Introduces symmetrical components. *Prereq. ECE 1246 and ECE 1363.*

ECE 1472 Power System Analysis **4 QH**
Presents basic methods for the analysis of power systems, including load flow, symmetrical short circuits, symmetrical component theory and unsymmetrical faults, and elements of power system protection, control, and transient stability. Uses power system software for some system studies. *Prereq. ECE 1471; ECE 1231 must be taken concurrently.*

ECE 1474 Power Electronics **4 QH**
Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and resonant converters. Illustrates modeling, analysis and control techniques on numerous application examples. Covers design problems including analysis and sizing of passive components (inductors and capacitors) in high-frequency DC/DC switching converters. *Prereq. ECE 1332 and ECE 1342.*

ECE 1486 Numerical Methods and Computer Applications **4 QH**
Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; least squares; numerical solution of ordinary and partial differential equations using a programming environment such as MATLAB. Chooses representative problems for solution on a computer. *Prereq. MTH 1225 and GE 1102.*

ECE 1501 Capstone Design 1 **2 QH**
Requires students to select a project requiring design and implementation of an electrical, electronic, and/or software system, form a team to carry out the project, and submit a detailed proposal for the work. *Prereq. ECE 1333, ECE 1342, ECE 1355, ECE 1364, ECE 1382, and senior standing.*

ECE 1502 Capstone Design 2 **4 QH**
Requires students to design and implement the project proposed in ECE 1501. Expects students to evaluate progress with interim milestone reports and to present the final design project with written and oral reports. *Prereq. ECE 1501 taken in previous quarter.*

ECE 1701 Capstone Design 1 (Honors) **2 QH**
Honors equivalent of ECE 1501.

ECE 1702 Capstone Design 2 (Honors) **4 QH**
Honors equivalent of ECE 1502.

ECE 1715 Circuits 1 (Honors) **4 QH**
Honors equivalent of ECE 1215.

ECE 1733 Linear Systems 2 (Honors) **4 QH**
Honors equivalent of ECE 1333.

ECE 1742 Electronics 2 (Honors) **4 QH**
Honors equivalent of ECE 1342.

ECE 1746 Circuits 2 (Honors) **4 QH**
Honors equivalent of ECE 1246.

ECE 1781 Computer Engineering 1 (Honors) **4 QH**
Honors equivalent of ECE 1381.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1001 Introduction to the Study of Engineering **1 QH**
Presents an introduction to the various disciplines of engineering and strategies for success both in the classroom and in practice within the profession.

GE 1002 Introduction to Engineering Cooperative Education **1 QH**
Introduces engineering freshmen students to the cooperative education curriculum and assists them through self-assessment in relation to the engineering profession. Uses the Myers Briggs Type Indicator and Super's Work Values Inventory, to provide students with an introduction to how personalities, work styles, personal values and interests relate to work performances and career choices. Students examine the engineering profession, develop résumé writing, interviewing, and time management skills, and are introduced to professional ethics.

GE 1101 Engineering Problem Solving and Computation **4 QH**
Uses developing and structuring approaches to solve engineering problems. Draws applications from a variety of engineering disciplines, which serve as a tool for introducing students to engineering analysis and design. Includes the design of problem-solving algorithms along with an introduction to the "C" programming language.

GE 1102 Engineering Problem Solving with Application Software **2 QH**
Develops fundamental problem-solving skills essential to all engineering disciplines. Introduces students to spreadsheet and math application packages and their use in solving engineering problems. Topics include data reduction and transformation, visualization of data and functions, problem structuring, and matrix applications. Examples stress real-life engineering analysis and design as a tool for introducing students to the engineering profession.

GE 1103 Engineering Design **4 QH**
Presents the engineering design process using case studies from a variety of engineering disciplines. Topics include problem formulation and specification, creativity, evaluation tools, patents, product liability, ergonomics, systems design, failure analysis, hazard prevention, manufacturing, ethics in engineering, and presentation techniques. Presents engineering graphics, focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Students will develop an original design solution to a technical problem as a term project and use CAD software extensively.

GE 1701 Engineering Problem Solving and Computation (Honors) **4 QH**
Honors equivalent of GE 1101.

GE 1702 Engineering Problem Solving with Application Software (Honors) **2 QH**
Honors equivalent of GE 1102.

GE 1703 Engineering Design (Honors) **4 QH**
Honors equivalent of GE 1103.

Mechanical, Industrial, and Manufacturing Engineering

MIM 1212 Probabilistic Analysis for Engineers **4 QH**
Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, moment generating functions, sampling distribution, and point and interval estimations. *Prereq. MTH 1125.*

MIM 1215 Engineering Economy **4 QH**
Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies effects of taxes on investment analysis. Utilizes mathematical and graphical models to evaluate candidate solutions to design alternatives.

MIM 1240 Materials Science **5 QH**
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq. CHM 1132.*

MIM 1241 Materials Science **4 QH**
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. *Non–ME Students.*

MIM 1245 Materials Science **4 QH**
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors, and junctions. *Prereq. CHM 1132.*

MIM 1250 Engineering Mechanics **5 QH**
Examines vector representation of force and moment, equivalent force systems, centroids and centers of gravity, and distributed forces. Examines free body diagrams and equations of equilibrium, applications to trusses, pin connected frames, and beams elementary concepts of friction. Examines fundamentals of dynamics, kinematics of particles, and kinetics of particles using force, mass, and acceleration.

MIM 1270 Thermodynamics **4 QH**
Studies the systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems on the ideal gas. Introduces the Second Law of Thermodynamics and the property of entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq. MTH 1223; not open to mechanical engineering majors.*

MIM 1280 Thermodynamics 1 **5 QH**
Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property of entropy. Emphasizes the macroscopic consequences of irreversibility and the limitation placed, through the Second Law, on the behavior of engineering systems. Available energy and its application in thermodynamics is investigated. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq. MTH 1223 taken concurrently.*

MIM 1300 Measurements and Analysis **5 QH**
Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

MIM 1312 Statistics **4 QH**
Examines the definition of a statistic and reviews the distributions and approximations of random variables. Introduces hypothesis testing, including tests for means, variances, and proportion. Covers nonparametric methods, analysis of variance, and simple linear regression. *Prereq. MIM 1300.*

MIM 1320 Work Design **4 QH**
Covers the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement synthetic standards and work sampling. Includes a project in which principles of work design must be applied.

MIM 1325 Operations Research 1 **4 QH**
Covers deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq. MTH 1223.*

MIM 1354 Strength of Materials **4 QH**
Explores the concept of stress and strain, state of stress and strain at a point, and stress-strain relations and material properties. Investigates moment of inertia of areas and stress properties. Investigates moment of inertia of areas, stress and deformation of simple members under axial and torsional loads, and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Non–ME Students.*

MIM 1355 Strength of Materials 1 **5 QH**
Explores the concept of stress and strain, state of stress and strain at a point, and stress-strain relations and material properties. Investigates moment of inertia of areas, stress and deformation of simple members under axial and torsional loads, and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq. MIM 1250.*

MIM 1356 Strength of Materials 2 **4 QH**
Covers asymmetrical bending, analysis of determinate and indeterminate beams by various methods, and buckling of columns. *Prereq. MIM 1355.*

MIM 1360 Dynamics **4 QH**
Development of problem-solving ability in dynamics. Examines kinematics of rigid bodies, including rotating reference frames; kinetics of rigid bodies using force, moment, mass moment of inertia, and acceleration. Examines kinetics of particles and rigid bodies using work and energy, and using impulse and momentum. *Prereq. MIM 1250.*

MIM 1364 Mechanics for Electrical Engineers **4 QH**
Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work, and energy; and impulse and momentum. *Prereq. PHY 1222.*

MIM 1366 Dynamics for Civil Engineers **4 QH**
Covers kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq. CIV 1210.*

MIM 1368 Dynamics 2 **4 QH**
Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq. MIM 1268.*

MIM 1370 Heat Transfer **5 QH**
Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq. ME 1280, MIM 1375, and MTH 1226.*

MIM 1374 Fluid Mechanics **4 QH**
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy), Newton's law of viscosity, dimensional analysis, integral forms of the basic laws (conservation of mass, momentum, and energy), pipe flow analysis, and differential formulation of basic laws with Laminar flow analyses. *Non–ME Students.*

MIM 1375 Fluid Mechanics **5 QH**
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with Laminar flow analyses. Includes labs and a computer project. *Prereq. MIM 1280 and MTH 1225.*

MIM 1380 Thermodynamics 2 **5 QH**
Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles, including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbocharging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq. MIM 1280.*

MIM 1400 Mechanical Engineering Computation and Interpretation **4 QH**
Studies the application of software tools to the solution of mechanical engineering problems. Techniques for purposes of understanding software, including finite element and finite difference development, will be treated as needed. Software for advanced strength analysis, fluid dynamics, and heat transfer problems will be included. Special emphasis on interpretation of results will be given throughout the course.

MIM 1410 Digital Simulation Techniques **4 QH**
Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq. Higher-level language and MIM 1312.*

MIM 1420 Computers and Information Systems **4 QH**
Examines the design and implementation of computer-based information systems. Topics include the value of information, tools of system analysis and design, the impact of computer-based information systems on organizations and society, rudimentary computer architecture, input devices, data organization and storage, system configuration, communications, and output/display devices.

MIM 1422 Systems **4 QH**
Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models, transfer functions and block diagrams, system components and the method of analogies, accuracy, and stability. *Prereq. MTH 1230.*

MIM 1425 Operations Research 2 **4 QH**
Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq. MIM 1312.*

MIM 1430 Manufacturing Systems and Techniques **5 QH**
Focuses on manufacturing and design and their impact on each other. Covers the basics of manufacturing systems and techniques. Examines manufacturing and design; manufacturing engineering, planning, and control; and automation in manufacturing. Topics include manufacturing systems, manufacturing processes, rapid prototyping, design for assembly, design for manufacturability, concurrent engineering, CAD/CAM systems, bill of materials, group technology, mechanical tolerancing, quality control, just-in-time philosophy, NC part programming, programmable logic controllers, flexible manufacturing systems, and CIM. Use of a manufacturing lab and related experiments are required for students to gain hands-on experience.

MIM 1440 Mechanical Behavior of Materials **4 QH**
Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq. MIM 1240.*

MIM 1445 Materials Processing **4 QH**
Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq. MIM 1240.*

MIM 1450 Mechanical Design **5 QH**
Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, and simulation; and optimization of mechanical systems. *Prereq. MIM 1356.*

MIM 1455 Mechanical Vibrations **5 QH**
Studies free and forced vibrations of undamped and damped one-degree-of-freedom systems. Includes rotational unbalance, support motion, vibration isolation, vibration measuring equipment, nonviscous damping, general periodic excitation, and nonperiodic excitation using numerical methods. Examines free and forced vibration of multi-degree-of-freedom systems, the vibration absorber, coordinate coupling, and normal modes of vibration. *Prereq. MIM 1360.*

MIM 1475 Thermal Design **5 QH**
Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq. MIM 1370.*

MIM 1480 Thermodynamics 3 **5 QH**
Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts, reacting gas mixtures and combustion, and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change, and normal shock waves. Includes a lab. *Prereq. MIM 1380.*

MIM 1501 Design Project 1 **5 QH**
Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq. MIM 1450 and MIM 1475.*

MIM 1502 Design Project 2 **5 QH**
Continues the project started in MIM 1501. Students remain in the same group and under the direction of the same faculty advisers as in MIM 1501. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq. MIM 1501.*

MIM 1505 Independent Study in Industrial Engineering **4 QH**
Allows independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of the quarter.

MIM 1506 Special Topics **4 QH**
When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq. Permission of the department.*

MIM 1507 Mechanical Engineering Project 1 **4 QH**
Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Senior standing.*

MIM 1508 Mechanical Engineering Project 2 **4 QH**
Continues MIM 1507. *Prereq. MIM 1507.*

MIM 1510 Production and Inventory Control **4 QH**
Explores design of basic inventory models and inventory management systems, single-stage and multistage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses and consideration of job shop scheduling and dispatching problems. *Prereq. MIM 1312 and MIM 1325.*

MIM 1512 Facilities Design **4 QH**
Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq. MIM 1325.*

MIM 1514 Material Handling System Design **4 QH**
Discusses the design and analysis of large material-handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and system acquisitions. *Prereq. MIM 1325.*

MIM 1516 Quality Assurance **4 QH**
Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq. MIM 1312.*

MIM 1518 Expert Systems **4 QH**
Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, machine learning techniques, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq. GE 1100, MIM 1212, MIM 1315, or permission of instructor.*

MIM 1520 Human Considerations in Engineering Design **4 QH**
Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

MIM 1522 Human-Machine Systems **4 QH**
Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

MIM 1528 Design Project **4 QH**
Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq. Senior standing.*

MIM 1530 Manufacturing Automation **4 QH**
Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq. MIM 1315 or permission of instructor.*

MIM 1540 Engineering Materials **4 QH**
Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq. MIM 1240.*

MIM 1550 Advanced Strength and Applied Elasticity **4 QH**
Covers analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq. MIM 1356.*

MIM 1555 System Analysis and Control **4 QH**
Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq. MIM 1360.*

MIM 1560 Computer-Aided Design **4 QH**
Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques of design and manufacture. Requires a design project. *Prereq. GE 1103 and MIM 1356.*

MIM 1561 Advanced Computer-Aided Design **4 QH**
Covers advanced applications of interactive graphics concepts to different engineering tasks, including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq. MIM 1560.*

MIM 1570 Internal Combustion Engines **4 QH**
Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq. MIM 1480.*

MIM 1575 Fluid Mechanics 2 **4 QH**
Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and the Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq. MIM 1375.*

MIM 1576 Gas Dynamics **4 QH**
Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows, including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq. MIM 1375.*

MIM 1750 Engineering Mechanics (Honors) **5 QH**
Examines vector representation of force and moment, equivalent force systems, centroids and centers of gravity, and distributed forces. Examines free body diagrams and equations of equilibrium, applications to trusses, pin connected frames, and beams elementary concepts of friction. Examines fundamentals of dynamics, kinematics of particles, and kinetics of particles using force, mass, and acceleration. *Prereq. MIM 1250.*

MIM 1755 Strength of Materials 1 (Honors) **5 QH**
Honors equivalent of MIM 1355. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq. MIM 1250.*

MIM 1770 Heat Transfer (Honors) **5 QH**
Honors equivalent of MIM 1370. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq. MIM 1280, MIM 1375, and MTH 1226.*

MIM 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in MIM 1777 an unlimited number of times, as it can be an adjunct to any mechanical engineering course.

MIM 1780 Thermodynamics 1 (Honors) **5 QH**
Honors equivalent of MIM 1280. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq. MTH 1223 taken concurrently.*

MIM 1796 Undergraduate Honors Thesis 1 **4 QH**
Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

MIM 1797 Undergraduate Honors Thesis 2 **4 QH**
Continues MIM 1796. *Prereq. MIM 1796.*

Engineering Technology

Computer Technology

CT 1150 Computer Organization **4 QH**
Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocesser programming, and input/output processing.

CT 1311 Programming with C++ Language **4 QH**
Presents C++, which is used to introduce students to Object-Oriented Programming (OOP). Covers functions, arrays, pointers, classes and abstraction, operating overloading, inheritance, virtual functions, polymorphism, and templates. A project is required. *Prereq. GET 1100.*

CT 1330 Data Structures **4 QH**
Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq. CT 1311.*

CT 1335 Numerical Methods **4 QH**
Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq. CT 1311 and MTH 1195.*

CT 1340 Software Engineering Design **4 QH**
Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq. CT 1330.*

CT 1345 Assembly Language **4 QH**
Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq. CT 1311 and CT 1150.*

CT 1346 Assembly Language Lab **1 QH**
Teaches how to program in 68000 assembly language and presents arithmetics operations, logic operations, and use of input/output functions available in the 68000 as part of a line editor experiment; control of a single-digit hexadecimal display output; use of hardware and software timers to generate a digital clock display; and other experiments that are consistent with the ones described above. *Prereq. CT 1311.*

CT 1348 LISP **4 QH**
Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq. CT 1330.*

CT 1351 Advanced Computer Organization **4 QH**
Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq. CT 1356 and CT 1375.*

CT 1355 Microprocessor Peripheral Hardware **4 QH**
Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq. CT 1374.*

CT 1356 Complex Peripheral Hardware **4 QH**
Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq. CT 1355.*

CT 1360 Industry Software **4 QH**
Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq. CT 1381.*

CT 1363 Concurrent Programming **4 QH**
Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq. CT 1330 and CT 1340.*

CT 1365 Industry Hardware **4 QH**
Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq. CT 1356.*

CT 1369 Digital Electronic Design **4 QH**
Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq. EET 1311.*

CT 1370 Computer Laboratory 1 **2 QH**
Offers experiments to investigate and test the behavior of basic digital gates and to design and implement simple logic circuits using Boolean theorems. Topics include voltage, current resistance, logic gates, logic functions, gate outputs, fan-in, fan-out, square-wave generation, and operational amplifiers. *Prereq. EET 1311.*

CT 1371 Computer Laboratory 2 **2 QH**
Provides experiments to design and implement building blocks of a computer system. Topics include counters, shift registers, arithmetic and logic units, control units, computer memory, and A/D and D/A converters. *Prereq. CT 1369 and CT 1374.*

CT 1372 Computer Laboratory 3 **2 QH**
Offers experiments that reinforce the concepts of microprocessor interfacing learned during classroom lectures. Topics include input/output ports, displays, interrupts, generating time intervals, interfacing mechanical switches, asynchronous communication, and memory systems. *Prereq. CT 1345 and CT 1374.*

CT 1374 Introduction to CPU Hardware **4 QH**
Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bust concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq. CT 1345 and CT 1368.*

CT 1375 CPU Architecture **4 QH**
Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq. CT 1374.*

CT 1377 VLSI Design **4 QH**
Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq. CT 1369.*

CT 1380 Data Communication Methods **4 QH**
Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq. CT 1375.*

CT 1381 Operating Systems **4 QH**
Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq. CT 1330.*

CT 1383 Databases **4 QH**
Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq. CT 1330.*

CT 1387 Bit-Slice Microcomputers **4 QH**
Demonstrates the basic design ground rules common to the bit-slice CPU style of hardware design. *Prereq. CT 1355.*

CT 1389 Single-Chip Microprocessors **4 QH**
Explains the hardware limitations of a single-chip system. When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. *Prereq. CT 1374.*

CT 1390 Special Problems in Computer Technology **4 QH**
Students perform theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

CT 1391 Topics in Computer Technology **4 QH**
Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq. Permission of the instructor.*

CT 1393 UNIX Operating System **4 QH**
Surveys advanced topics related to UNIX and its filing system. Studies the advance features in the editor and system utilities as well as the general theory of an operating system with emphasis on the relationship between the kernal, filing system, and standard libraries. Discusses low level I/O, forks, pipes, and signaling, and introduces the use of nroff, sed, lint, cc, lex, and yacc. *Prereq. CT 1330.*

CT 1394 Object-Oriented Programming **4 QH**
Examines the methodologies currently used in object-oriented programming languages, drawing on case studies of Small Talk, Flavors, CLOS, and C++. Other topics include G-Base, an object-oriented database system, and the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq. CT 1330.*

CT 1395 Computer Security **4 QH**
Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq. CT 1380.*

CT 1396 PROLOG: An Introduction to Artificial Intelligence **4 QH**
Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq. CT 1330.*

CT 1397 Advanced UNIX Programming **4 QH**
Studies the design and development of C application programs that interface with the UNIX operating system kernel. Enables C programmers to interact with the UNIX operating system through system calls and library routines. Topics include system programming tools, fundamental concepts, file creation and access, signal and signals handling, multitasking, file and terminal I/O, process creation and programming execution, and forms of interprocess communication and synchronization (pipes, message queues,

semaphores, and shared memory). Students use the University's computer facilities to prepare course assignments. *Prereq. CT 1393.*

CT 1480 Local Area Networks 1 **4 QH**
Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq. CT 1380. Not open to students who have taken CT 1379.*

CT 1481 Local Area Networks 2 **4 QH**
Examines the upper four layers of the ISO reference model; transport, session, presentation and application layers. Topics include TCP/IP, DECNET, NETBIOS, FTP, TELNET, and E-MAIL. *Prereq. CT 4480 or CT 1480.*

CT 1492 Independent Study in Computer Technology **4 QH**
Independent study of advanced computer technology projects for students usually in the upper junior or senior year having high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq. Permission of advisor and project supervisor.*

Electrical Engineering Technology

EET 1151 Circuit Analysis 1 **4 QH**
Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq. MTH 1193 or PHY 1193.*

EET 1152 Circuit Analysis 2 **4 QH**
Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. *Prereq. EET 1151.*

EET 1310 Electrical Measurements **4 QH**
Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq. EET 1353.*

EET 1311 Digital Electronics 1 **4 QH**
Introduces elements of digital electronics, starting with the binary number system and proceeding to Boolean algebra and DeMorgan's theorems. Discusses combinatorial logic in detail and the basic circuitry to realize AND, OR, and NOT devices. Gives an introduction to sequential logic and the bistable devices required to realize it. Proceeds to the basic sequential circuits such as counters and shift registers. Includes the analysis and design of both combinatorial and sequential circuits. *Prereq. EET 1152.*

EET 1312 Analog Electronics 1 **4 QH**
Reviews the theory of linear circuits and extends it to simple non-linear circuits of both the two-terminal variety and the three-terminal variety. Considers the solid-state theory of the PN diode as an example of the two-terminal non-linear device, and the NPN, PNP, and field-effect devices as examples of the three terminal non-linear elements. Includes light-sensitive and heat-sensitive solid-state devices. Considers the problem of selecting an operating point for a non-linear device, and the corresponding practical methods of providing the required biases. Introduces the small-signal linear model for the non-linear device in the vicinity of the operating point. *Prereq. EET 1152, PHY 1193.*

EET 1313 Analog Electronics 2 **4 QH**
Reviews small-signal models for three-terminal devices and discusses frequency response of such models, including the Bode asymptotic approximation to frequency response. Also reviews Mason's signal flow graph concepts for determining transfer functions. Examines operational amplifiers including their ideal behavior and the limitations introduced by finite input and output impedances, finite gain, and finite bandwidth. Explores feedback and stability problems that can occur when using operational amplifiers. Studies applications of feedback to oscillators and active filters. *Prereq. EET 1312.*

EET 1314 Digital Electronics 2 **4 QH**
Reviews the basic concept of Boolean algebra, combinatorial logic, and binary arithmetic, and extends them to the design of coding systems such as binary, binary-coded decimal, Gray code, seven-segment displays, and multiplexers. Introduces flip-flops and sequential logic circuits such as ripple counters, synchronous counters, ring counters and Johnson counters, shift registers, solid-state memory devices, and the 555 timer. Emphasizes design of digital systems using the available microelectronic gates, primarily in the TTL series. *Prereq. EET 1313.*

EET 1315 Digital Electronics 3 **4 QH**
Examines the physical devices that are used to realize digital circuits, as a complement to the previous treatment of idealized mathematical models. Introduces the concepts of rise-time, fall-time, set-up time, hold time, delay time, and the maximum frequency of a clock. Discusses the presently available logic families such as TTL, CMOS, and EC, compares them, and considers the problems of interconnecting them. Introduces memory elements and field-programmable logic elements. Presents interfacing devices such as analog-to-digital and digital-to-analog converters. *Prereq. EET 1314.*

EET 1317 Principles of Communication Systems 1 **4 QH**
Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq. EET 1313.*

EET 1318 Principles of Communication Systems 2 **4 QH**
Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq. EET 1317.*

EET 1319 Principles of Communication Systems 3 **4 QH**
Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system

capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq. EET 1318.*

EET 1320 Electricity and Electronics 1 **4 QH**
Introduces circuit analysis, resistive networks, periodic excitation function, steady state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq. MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.*

EET 1321 Electricity and Electronics 2 **4 QH**
Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq. EET 1320.*

EET 1323 Electronic Laboratory **2 QH**
Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq. EET 1311.*

EET 1324 Circuits Laboratory 1 **2 QH**
Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq. EET 1151.*

EET 1325 Circuits Laboratory 2 **2 QH**
Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 1124.*

EET 1327 Advanced Electronics Laboratory 1 **2 QH**
Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq. EET 1323.*

EET 1328 Advanced Electronics Laboratory 2 **2 QH**
Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 1327.*

EET 1329 Advanced Electronics Laboratory 3 **2 QH**
Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phaselocked loop, as well as a series of microwave experiments and digital experiments. *Prereq. EET 1328.*

EET 1330 Energy Conversion **4 QH**
Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 1152 and MTH 1195.*

EET 1337 Distributed Systems **4 QH**
Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq. MTH 1195 and PHY 1193.*

EET 1353 Circuits Analysis 3 **4 QH**
Introduces three-phase circuits and three-phase, single-phase systems. Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 1152.*

EET 1354 Circuits Analysis 4 **4 QH**
Explores the Bode asymptotic frequency response approximation and the concept of Mason's signal flow graphs. Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq. EET 1353.*

EET 1360 Engineering Analysis 1 **4 QH**
Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq. EET 1152 and MTH 1195.*

EET 1362 Basic Power Systems 1 **4 QH**
Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq. EET 1354.*

EET 1363 Basic Power Systems 2 **4 QH**
Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq. EET 1362.*

EET 1364 Basic Power Systems 3 **4 QH**
Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 1363.*

EET 1370 Digital Computers 1 **4 QH**
Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq. EET 1311.*

EET 1371 Digital Computers 2 **4 QH**
Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq. EET 1370.*

EET 1377 Control Engineering 1 4 QH
Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq. EET 1354 and MTH 1195.*

EET 1378 Control Engineering 2 4 QH
Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq. EET 1377.*

EET 1390 Optical Instrumentation 4 QH
Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimage-forming systems used for analysis control and metrology. *Prereq. MTH 1192 and PHY 1193.*

EET 1399 Special Problems in Electrical Engineering Technology 4 QH
Offers theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

General Engineering Technology

GET 1100 Computer Programming for Engineering Technology 4 QH
Introduces computers for problem solving using C++ language. Topics include data types, arithmetic and logical expressions, programming loops, decision making, functions, arrays, and character string manipulation. Offers the use of the University's computer facility to run programs. *Prereq. MTH 1191 or taken concurrently.*

GET 1102 Introduction to Engineering Technology 4 QH
Introduces the role of the engineering technologist in industry. Topics include engineering problem-solving, engineering design, and analysis of how engineering and technology devices and concepts "work." Introduces technical concepts through practical applications. Includes in-class experiments, group projects, and opportunities to apply verbal and written skills.

GET 1103 Freshman Seminar 1 QH
Introduces students to engineering technology by identifying types of opportunities in each of the technology disciplines. Topics include a discussion of cooperative work assignments and job opportunities available to graduates. Utilizes industry speakers, faculty, and graduates. Additionally, seminars will be provided in advisory areas such as note taking, test taking, and time management.

GET 1104 Product Design 4 QH
Introduces students to the product realization process used by most successful product companies in industry. Discusses the product development process and organizations, customer needs, product specifications, generation and selection of concepts, and industrial design. Uses industry cases and provides the needed design link from design graphics and CAD to upper level design courses. *Prereq. GET 1171.*

GET 1105 Computer Applications for Tech 4 QH
Studies the basics of computing in a microprocessor environment (DOS, Windows, MAC, word processing, databases, spreadsheets) with emphasis on applications relevant to technology students. Provides a solid foundation upon which students can develop more extensive computer expertise. Acquired skills are transferable to subsequent courses; cooperative education assignments; and personal and professional endeavors.

GET 1170 Engineering Graphics 1 4 QH
Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2 4 QH
Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq. GET 1170 or equiv.*

GET 1320 Engineering Ethics 1 1 QH
Uses a case-study approach to examine basic ethical issues likely to confront engineering students on co-op and in their after-graduation professional practice. Attention is given to issues such as licensing, dissent with management, employee responsibilities, trade secrecy versus publication rights, advertising, and product liability. Discusses these issues in the context of the codes of engineering ethics of the engineering societies and general ethical theory. *Prereq. Middler standing or permission of instructor.*

GET 1356 Engineering Economy 4 QH
Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 1191.*

GET 1364 Kinematics 4 QH
Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions and introduces the computer as a tool to enhance these concepts. Analyzes reverted and epicyclic gear trains and cam displacement. *Prereq. GET 1171 and PHY 1191.*

Mechanical Engineering Technology

MET 1301 Mechanics A 4 QH
Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq. MTH 1193, PHY 1191.*

MET 1302 Mechanics B 4 QH
Emphasizes friction, second moments, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq. MET 1301.*

MET 1303 Mechanics C 4 QH
Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and accelera-

tion; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq. MET 1302.*

MET 1314 Stress Analysis A **4 QH**
Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, and indeterminate members. Topics include centric loading of bolted and welded connections, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq. MET 1301.*

MET 1315 Stress Analysis B **4 QH**
Discusses beam deflections and reactions by various methods, theorem of three moments and torsional stresses and strains. Topics include pressure vessels, power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq. MET 1314.*

MET 1319 Mechanics **4 QH**
Introduces mechanics to nonmechanical majors. Topics include statics of particles and rigid bodies, and kinematics and kinetics of particles and rigid bodies. *Prereq. MTH 1193 and PHY 1191.*

MET 1330 Mechanical Design A **4 QH**
Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq. MET 1315, MET 1380.*

MET 1331 Mechanical Design B **4 QH**
Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. Emphasizes group design projects. *Prereq. MET 1330.*

MET 1333 Design Laboratory **2 QH**
Provides the opportunity for students to develop group design projects that have been developed as a part of their senior design course (MET 1330 and MET 1331). Projects will be completed and presented to their peers and to the faculty. This course must be taken in conjunction with MET 1331. *Prereq. MET 1330.*

MET 1340 Thermodynamics A **4 QH**
Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases. Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq. PHY 1192.*

MET 1341 Thermodynamics B **4 QH**
Discusses theory and analysis of actual engine types using gas and internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of gas turbine cycles, steam power cycles, cogeneration systems, and introduction to air-conditioning and refrigeration systems. *Prereq. MET 1340.*

MET 1342 Refrigeration and Air-Conditioning **4 QH**
Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1341.*

MET 1343 Heat Transfer **4 QH**
Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and heat exchanger design and selection. *Prereq. MET 1341.*

MET 1373 Fluid Mechanics **4 QH**
Covers the principles of fluid statics and dynamics. Includes topics such as fluid flow in pipes, friction losses, fluid energy, Bernoulli's theorem, flow measurement, open channel flow, pump and fan design, and selection. *Prereq. MET 1032.*

MET 1380 Materials A **4 QH**
Introduces fundamental metallic structures, general metallurgic information covering polymer, ceramic, composite, and properties, testing, and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and selection of materials for engineering applications.

MET 1388 Measurement and Analysis **5 QH**
Examines the theory of mechanical measurements, instruction, and experimentation data and report writing. Applies the principles developed in class to the laboratory, and a detailed technical report is required. Laboratory experiments include such topics as experimental analysis; statistical techniques; and mechanical measurements of temperature, pressure, force, deformation, strain, and rotational frequency. *Prereq. MET 1195, GET 1105, and PHY 1192.*

MET 1391 Mechanical Projects Laboratory **2 QH**
Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 1315, MET 1380, MET 1390, or taken concurrently.*

MET 1392 Fluids Laboratory **2 QH**
Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, oriface plates, venturii and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq. MET 1390, MET 1370, or taken concurrently.*

MET 1393 Thermodynamics Laboratory **2 QH**
Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq. MET 1390, MET 1341, or taken concurrently.*

MET 1394 Technology Laboratory D **2 QH**
Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq. MET 1341, MET 1343, MET 1393, or taken concurrently.*

MET 1395 Technology Laboratory E **2 QH**
Offers experiment, analytical, and design projects to examine mechanical engineering concepts. *Prereq. MET 1342, MET 1343, and MET 1390.*

MET 1396 Machine Shop **4 QH**
Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations **4 QH**
Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include design of vibration mounts for mechanical equipment, modeling of vibrational systems, shock testing, and computer applications. Laboratory experiments are included. *Prereq. MET 1303.*

MET 1416 Stress Analysis C **4 QH**
Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings, and an introduction of finite element analysis. *Prereq. MET 1315.*

MET 1444 Power Generation **4 QH**
Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation.

MET 1481 Materials B **4 QH**
Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, composites, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both metals and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystalization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq. MET 1380.*

MET 1499 Special Problems in Mechanical Engineering Technology **4 QH**
Theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

Nursing

NUR 1102 Introduction to Human Nutrition **4 QH**
Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Uses principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice.

NUR 1107 Nursing Process and Skills **3 QH**
Emphasizes the centrality of critical thinking to clinical reasoning. Introduces the nursing process as a problem-solving tool and its application in assessing strategies of communication, gathering data, interpreting evidence, analyzing viewpoints, and forming judgments. Provides scientific principles as the framework for using basic nursing skills in the practice of selected nursing interventions. Includes practicing skills in a clinical laboratory. *Prereq. NUR 1110 and MTH 1101 or taken concurrently.*

NUR 1110 Nursing Health Assessment **4 QH**
Emphasizes dimensions of collecting data relevant to health status. Provides an opportunity for learning to use tools and skills of health assessment. Discusses ethnic, cultural, spiritual, social, psychological, developmental, and gender and physical aspects of health assessment. Explores formulating nursing diagnosis and examining the relationship of the nursing care plan to overall resources of the client. Includes practicing skills in a clinical laboratory.

NUR 1202 Pathophysiological Concepts for Clinical Nursing **4 QH**
Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological functions, endocrine functions, and skin integrity. Explores how the human body uses its adaptive powers to maintain equilibrium and how alterations affect normal processes. Examines disease processes and implications for nursing practice. *Prereq. BIO 1164 or equivalent.*

NUR 1206 Promoting Healthy Childbearing and Childrearing **8 QH**
Emphasizes the promotion of health from conception to adolescence. Describes potential and actual health-risk factors and explores risk-reduction strategies within the context of the individual, family, and community. Uses the nursing process to provide the framework for students to assess and intervene therapeutically in promoting healthy childbearing and childrearing. Examines the concepts of human development of individual, family, and community within the context of the role of the professional nurse in promoting healthy childbearing and childrearing. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1164, BIO 1654, CHM 1107, COP 1370, ENG 1110, ENG 1111, PSY 1111, NUR 1102, NUR 1107, and NUR 1110.*

NUR 1208 Promoting Healthy Adulthood and Aging **8 QH**
Emphasizes the promotion of health in adults and includes common health problems of adults at critical life stages from the young adult to the frail, elderly years. Analyzes potential and actual health-risk factors and the discovery of risk-reduction strategies by applying the nursing process to the care of adults living within families and communities. Enables students to use health education and teaching methods in assessing and intervening therapeutically to meet the primary health care needs of adults. Assesses the role of the nurse in partnership with the family and community in disease prevention. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1122, BIO 1622, and NUR 1206.*

NUR 1282 Wellness **4 QH**
Focuses on experiential exploration of the concept of wellness. Examines behaviors and life-style choices that lead to a high level of physical, emotional, and spiritual well-being. Includes issues of assessment of health risk, behavior change, life-style analysis, and the life cycle and stress management through self-analysis. *Open to any undergraduate student.*

NUR 1304 Independent Study Elective **2 QH**
Allows students to pursue a topic more intensely or with a special focus. Enables students to contract with a faculty member whose background, interests, and time allow direction of in-depth study. Requires student and faculty member jointly develop course objectives. *Prereq. Permission of academic adviser.*

NUR 1306 Promoting Health Restoration in Children **10 QH**
Focuses on the therapeutic nursing interventions used to restore health to children who are experiencing acute and/or complex health problems. Analyzes complex health issues within the context of the individual, family, and community. Examines altered family patterns of coping within a developmental framework and describes support to meet the unique health needs of the family and child. Addresses the therapeutic role in partnership with the family and resources available within a collaborative and interdisciplinary environment. Discusses ethical and legal dimensions of caring for children and their families. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1202, NUR 1206, NUR 1208, NUR 1307, NUR 1308, PCL 1306, and PCL 1307.*

NUR 1307 Influences of Health and Illness **4 QH**
Enables the student to understand the values that underlie health-seeking behavior and providing care. Uses values clarification to appreciate individual rights and responsibilities versus the common good. Examines cultural differences in light of individual and group behavior as well as life span issues and family and group responsibilities. Builds a caring ethic and a sense of professional responsibility on the basis of self-awareness and self-examination.

NUR 1308 Promoting Health Restoration in Adults **10 QH**
Focuses on the therapeutic nursing interventions used to restore health to adults who are experiencing acute and/or complex health problems. Analyzes deviations from health with attention to the implications for the individual, as well as the family, in coping with health problems. Analyzes the client's health care needs and the resources to meet them, in collaboration with the client and health providers. Discusses ethical and legal dimensions of nursing care of adults. Emphasizes discharge planning and teaching. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1202, NUR 1206, NUR 1208, PCL 1306, and PCL 1307.*

NUR 1406 Promoting Healthy Communities **7 QH**
Focuses on developing, implementing, and evaluating therapeutic interventions for the community as the client. Uses the nursing process, within the community context, informed by epidemiological trends, sociocultural characteristics, political and legislative influences, organizational programs, environmental factors, and consumer inputs. Emphasizes the role of the public-health nurse in multiple arenas of practice. Examines epidemiological principles and public-health policies in relation to identified health problems and conditions in a specific community. Enables students to conduct a comprehensive assessment, in partnership with the community, to develop a program to meet an identified community health need. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1306, NUR 1308.*

NUR 1408 Promoting Mental Health Restoration **7 QH**
Focuses on developing, implementing, and evaluating psychotherapeutic interventions for clients with complex mental health problems. Analyzes alterations in psychobiological and psychosocial functioning and coping. Formulates a plan of care within the context of the client as individual, family, group, and community. Emphasizes the therapeutic use of the self as students develop communication and other helping skills in interpersonal relationships with clients. Provides the opportunity to apply theories, principles, and research findings in providing mental health care for clients in various settings. Fosters collaboration with the client and interdisciplinary team. Discusses the political, legal, and ethical issues related to the delivery of mental-health services and the creative role of the nurse. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1306, NUR 1308.*

NUR 1502 Introduction to Research in Nursing **4 QH**
Builds on students' prior exposure to selected studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq. Concurrent SOC 1320 or equivalent.*

NUR 1507 Comprehensive Nursing Practicum **6 QH**
Helps students to synthesize nursing knowledge, skills, and experience and facilitate their transition to professional nursing practice and case management of clients with complex health problems. Enables students to demonstrate leadership and collaborative skills in working with other members of the health care team. Examines professional, role, and career issues in weekly seminars. Includes clinical learning experiences in a variety of settings. *Prereq. Senior standing or concurrent NUR 1406, NUR 1408, and NUR 1508.*

NUR 1508 Managing and Leading in Nursing **6 QH**
Focuses on the knowledge and skills related to the delivery of health services within a nursing management context. Presents theories, concepts, and models, such as managed care, organization and management, authority, delegation, resource allocation, budgeting, leadership and empowerment, change, motivation, environmental safety, quality improvement, collective bargaining, and conflict resolution, to give the student an understanding of the knowledge base for the management role of the baccalaureate nurse. Provides the opportunity to apply principles and practice skills in planning and delegating nursing care using different organizational models and approaches. Discusses the developing creative role for managing and leading in nursing. Includes clinical learning experiences in a variety of settings. *Prereq. Senior standing or concurrent NUR 1406 and NUR 1408.*

NUR 1606 Women's Health Choices and Decisions **4 QH**
Explores personal health and safety concerns specific to women from menarche to mid-life. Helps empower students to take charge of their health by examining personal experiences, their knowledge base, and developing self-awareness. Investigates self-promotion of health; how to be a knowledgeable consumer; when and how to choose a provider; and care options for fertility regulation, infertility, pregnancy, childbirth, and other conditions specific to women. *Open to any undergraduate student.*

Pharmacy and Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training **3 QH**
Introduces students to the profession of athletic training, presents the athletic trainer's role in the health-care community, and introduces basic injury prevention and first aid techniques. Serves to educate students about cooperative education, including résumé preparation, job searches, and interview techniques. *Prereq. AT majors or permission of instructor.*

ATP1050 Emergency Care of Athletic Injuries **3 QH**
Teaches recognition and management of medical emergencies, emphasizing those conditions most commonly suffered by athletes. Upon successful completion of this course, the student will be awarded American Red Cross certification in CPR and First Aid. *Prereq. ATP 1000 or permission of instructor.*

ATP 1100 Prevention and Care of Athletic Injuries **3 QH**
Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq. ATP 1000.*

ATP 1101 Athletic Training Laboratory **1 QH**
Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills.

ATP 1110 Fundamentals of Athletic Training **3 QH**
Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions.

ATP 1200 Clinical Athletic Training **4 QH**
Introduces students to the manual skills required in the profession. Covers goniometric and anthropometric measurement; splinting, bracing, and taping; assisted ambulation techniques; and protective devices. *Prereq. ATP 1100 and ATP 1101.*

ATP 1300 Lower Extremity Evaluation **4 QH**
Focuses on the evaluation and management of orthopedic trauma of the lower extremities, head, and cervical spine. *Prereq. ATP 1200.*

ATP 1350 Upper Extremity Evaluation **4 QH**
Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq. ATP 1100 and ATP 1300.*

ATP 1360 Applied Neuroscience **5 QH**
Covers morphology and functions of the human nervous system. Discusses the normal function and structure of the nervous system and the effects of structural abnormalities on nervous system functions. Includes lecture and laboratory involving handling of human brain tissue. *Prereq. BIO 1152, BIO 1153, BIO 1154, and ATP 1300 or permission of the instructor.*

ATP 1390 Athletic Training Practicum 1 **3 QH**
Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform professional skills under a certified athletic trainer's supervision. *Prereq. ATP 1100 and ATP 1200.*

ATP 1400 Therapeutic Modalities in Athletic Training **4 QH**
Presents the physical agents used in orthopedic therapy. Emphasizes each modality's theoretical and physiological effects on the healing process and presents the indications and contraindications of use. *Prereq. ATP 1300.*

ATP 1490 Athletic Training Practicum 2 **3 QH**
Same as ATP 1390.

ATP 1500 Therapeutic Reconditioning **4 QH**
Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq. ATP 1200 and ATP 1300.*

ATP 1590 Athletic Training Practicum 3 **3 QH**
Same as ATP 1390.

ATP 1600 Organization and Administration of Athletic Training Programs **4 QH**
Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq. ATP 1100, ATP 1200, and ATP 1300.*

ATP 1690 Athletic Training Practicum 4 **3 QH**
Same as ATP 1390.

ATP 1800 Senior Seminar **4 QH**
Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq. Senior standing in the athletic training major.*

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 **1 QH**
Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health care delivery. Orients students to the department, the college, and the University.

CPS 1112 Cardiopulmonary Sciences Seminar 2 **1 QH**
Reviews the goals, policies, and procedures of the co-op program. Studies the referral process, co-op options, and professional issues within the cardiopulmonary sciences program and the three concentrations within the program (cardiovascular technology, exercise physiology, and respiratory therapy). Gives students the opportunity to learn effective job search strategies through developing résumés, preparing for interviews, identifying work values, and understanding how to make informed choices. Students will analyze cases of communication, problem solving,

ethical and workplace issues and learn of appropriate coping mechanisms and resources available to assist them.

CPS 1113 Cardiopulmonary Sciences Seminar 3 **1 QH**
Introduces cardiopulmonary sciences students to the various areas of study within the major. Focuses on medical terminology for health professional majors. Concentrates on everyday word skills used in the medical community. Uses class meetings to introduce and reinforce individual prefixes, root words, suffixes, and their combination.

CPS 1115 Basic Life Support and Cardiac Assessment **2 QH**
Provides cardiopulmonary science students with basic life support (BLS) and cardiac assessment skills. Offers information about (1) coronary artery disease, (2) cardiopulmonary anatomy and physiology, (3) actions for survival, and (4) technical aspects of cardiopulmonary resuscitation (CPR) and foreign body airway obstruction clearance for adults, children, and infants. Includes BLS modules recommended by the American Heart Association (AHA) for health-care providers. A BLS health-care provider card will be issued by the AHA to students who successfully complete the course.

Also gives students the opportunity to learn, practice, and demonstrate proper techniques for obtaining heart rates, blood pressure monitoring, and basic EKG procedures. Integrates both lecture and lab sessions. Requires students to participate in one out-of-class session at either the Wellness Office, the Cardiovascular Health and Exercise Clubs, or a Community/Campus Health Fair.

CPS 1116 CPS Seminar **1 QH**
A professional seminar required for transfer students in the Cardiopulmonary Science Department. Substitutes for CPS 1111 and CPS 1112. Focuses on an introduction to the University and the college in the first half of the course. Prepares students for participation in the cooperative education program in the second half.

CPS 1211 Practicum in Respiratory Care **4 QH**
Provides clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq. CPS 1320 and CPS 1321. CPS 1301 and CPS 1332 taken concurrently.*

CPS 1301 Professional Practice Laboratory 1 **1 QH**
Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq. CPS 1321 and CPS 1332 concurrently.*

CPS 1302 Professional Practice Laboratory 2 **1 QH**
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1211, CPS 1301, and CPS 1433 concurrently.*

CPS 1314 Practicum in Respiratory Care 2 **6 QH**
Focuses on treating patients with more complex cardiorespiratory disorders. The second course in a sequence of three directly related to the clinical practice of various modalities of respiratory care. *Prereq. CPS 1211, CPS 1302, CPS 1433, and CPS 1434.*

CPS 1315 Practicum in Respiratory Care 3 **6 QH**
Provides clinical experience in hospitals. Emphasizes respiratory care for adult, pediatric, and neonatal critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq. CPS 1314, CPS 1403, CPS 1434 and CPS 1404 and CPS 1576 concurrently.*

CPS 1320 Advanced Cardiopulmonary Physiology **4 QH**
Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Prereq. PAH 1202 and PAH 1204 or equivalent.*

CPS 1321 Cardiopulmonary Disease **4 QH**
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq. CPS 1320, PAH 1202, and PAH 1204.*

CPS 1332 Introduction to Respiratory Care **4 QH**
Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. Basic to all other professional respiratory therapy courses. *Prereq. CPS 1301 and CPS 1321 concurrently.*

CPS 1403 Professional Practice Laboratory 3 **1 QH**
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1302 and CPS 1434 concurrently.*

CPS 1404 Professional Practice Laboratory 4 **1 QH**
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1403 and CPS 1576 concurrently.*

CPS 1408 Research Design **4 QH**
Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq. Statistics.*

CPS 1414 Clinical Seminar 1 **1 QH**
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq. CPS 1314 concurrently.*

CPS 1415 Clinical Seminar 2 **1 QH**
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq. CPS 1315 concurrently.*

CPS 1433 Respiratory Care for the Medical and Surgical Patient **4 QH**
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq. CPS 1211, CPS 1302, and CPS 1332 concurrently.*

CPS 1434 Respiratory Care for the Critical Patient **4 QH**
Focuses on respiratory-care problems encountered with patients in intensive care units. The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. *Prereq. CPS 1403 and CPS 1433 concurrently.*

CPS 1516 Advanced Clinical Seminar 1 **1 QH**
Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq. CPS 1641 concurrently.*

CPS 1517 Advanced Clinical Seminar 2 **1 QH**
Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq. CPS 1642 concurrently and CVT status.*

CPS 1518 Advanced Clinical Seminar 3 **1 QH**
Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq. CVT senior status.*

CPS 1570 Fundamentals of Perfusion Technology **4 QH**
Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. *Prereq. Perfusion Technology students only.*

CPS 1571 Advanced Life Support Systems 1 **4 QH**
Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq. Senior status in CPS.*

CPS 1572 Perfusion Technology **4 QH**
Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq. CPS 1570.*

CPS 1576 Neonatal and Pediatric Respiratory Care **4 QH**
Provides students with an understanding of the methods and techniques of respiratory therapy for neonatal and pediatric patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq. RT senior status.*

CPS 1578 Advanced Medical Monitoring **4 QH**
Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq. Perfusion Technology students only.*

CPS 1611 Kinesiology **4 QH**
Investigates the science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq. PHY 1201, PHY 1501; PAH 1202 and PAH 1204 or equivalent.*

CPS 1612 Exercise Physiology 1 **4 QH**
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Does not include a lab. *Prereq. PAH 1202 and PAH 1204.*

CPS 1613 Laboratory in Clinical Exercise Testing and Prescription **4 QH**
Presents a didactic and lab experience in assessing cardiopulmonary function, and muscular strength and endurance, as well as body composition, in a variety of clinical syndromes. Gives students the opportunity to prescribe exercise programs for a variety of special clinical populations. *Prereq. CPS 1615 and CPS 1619.*

CPS 1614 Electrocardiography **4 QH**
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq. CPS 1615, PAH 1202, PAH 1204 or equivalent.*

CPS 1615 Exercise Physiology 1 **5 QH**
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Includes a laboratory. *Prereq. PAH 1202 and PAH 1204.*

CPS 1616 Exercise Physiology 2 **4 QH**
Studies the role of exercise in health and disease, including acute and chronic effects of exercise upon the cardiovascular, pulmonary, and metabolic systems of individuals with cardiovascular, pulmonary, or metabolic diseases. Specifically explores therapeutic benefits of exercise intervention and rehabilitation for individuals with heart disease, chronic obstructive pulmonary disease, diabetes, obesity, osteo- and rheumatoid arthritis, osteoporosis, and low back pain. *Prereq. CPS 1615.*

CPS 1618 Cardiopulmonary Assessment **5 QH**
Provides students with the opportunity to gain knowledge and understanding of physiological principles and concepts related to clinical cardiopulmonary assessment. Integrates lecture topics with practical laboratory experiences in physical examination techniques, and basic pulmonary function assessment. *Prereq. CPS 1320 and CPS 1321.*

CPS 1619 Exercise Prescription and Programming in Cardiovascular Health **4 QH**
Focuses on skills needed to develop individualized exercise prescriptions for apparently healthy patients. Concentrates on the design, implementation, and evaluation of fitness and wellness programs for individuals and groups in a corporate or commercial setting. *Prereq. CPS 1320 and CPS 1615 concurrently.*

CPS 1622 Clinical Exercise Physiology Practicum 1 **6 QH**
Provides a professional field assignment in a clinical setting designed to help prepare students in their professional career choice. Students will complete a rotation in exercise testing and

cardiac rehabilitation. During the course, students will assume more patient care responsibility and develop the skills necessary to function independently. *Prereq. Coursework through Quarter 9 in Exercise Physiology curriculum.*

CPS 1623 Clinical Exercise Physiology Practicum 2 **6 QH**
Offers a professional field assignment in a clinical setting designed to help prepare students in their professional career choice. Students will complete a rotation in one of the following: exercise testing, cardiac rehabilitation, pulmonary rehabilitation, diabetic rehabilitation, or nonclinical adult fitness/health promotion. During the course, students will assume more patient care responsibility and develop the skills necessary to function independently. *Prereq. CPS 1622.*

CPS 1632 Health Science Education **4 QH**
Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills. *Prereq. CPS junior status.*

CPS 1641 Fundamentals of Cardiac Catheterization **4 QH**
Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. *Prereq. CPS 1320 and CPS 1321.*

CPS 1642 Advanced Cardiac Catheterization **4 QH**
Covers advanced cardiac catheterization interventional techniques such as coronary angioplasty, stents, and atherectomy. Introduces new technologies such as coronary rotablator and lasers. Includes other techniques such as the intra-aortic balloon pump, cardiac pacemakers, and cardiac studies using biopsy, pericardiocentesis, and electrophysiology. *Prereq. Senior year status, CPS 1516, CPS 1641, and CPS 1644 concurrently.*

CPS 1643 Echocardiography **4 QH**
Provides a comprehensive course in adult echocardiography, including an introduction to basic cardiac embryology and cardiac physics. Outlines and discusses M-Mode, 2-D, and Color Doppler techniques. Covers transducer positions and echo features of normal versus abnormal echo findings in valvular heart disease, prosthetic heart valves, pericardial disease, and cardiac tumors. *Prereq. Anatomy and Physiology 1 and 2, Pathophysiology or equivalent.*

CPS 1644 Cardiovascular Technology Internship **6 QH**
Provides cardiovascular technology students with the opportunity to develop, practice, and master skills required to assist with diagnostic and interventional procedures in the cardiac catheterization laboratory. *Prereq. CPS 1642 concurrently.*

CPS 1645 Practicum in Cardiovascular Technology 2 **6 QH**
Provides cardiovascular technology (CVT) students with the clinical opportunity to develop procedural skills for assisting with cardiac catheterization and echocardiography. During the practicum, the student will assume greater CVT responsibility and develop the technical skills necessary to function independently. Emphasizes students' ability to assist the physician, evaluate the patient's clinical status and update the physician, and problem solve to meet the needs of the patient. *Prereq. CPS 1643 concurrently.*

CPS 1801 Directed Independent Study 1 **2 QH**
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken.

CPS 1802 Directed Independent Study 2 **2 QH**
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken.

CPS 1810 Continuation of Clinical **0 QH**
Provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in CPS 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for CPS 1515, and I grades will be changed to the grades earned at that time.

CPS 1820 Internship in Cardiovascular Health and Exercise **12 QH**
Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting. Students must successfully complete 360 hours of internship experience in addition to other written assignments. *Prereq. Completion of quarter 9 in the cardiovascular health and exercise curriculum.*

Counseling Psychology, Rehabilitation, and Special Education

CRS 1200 Introduction to Special Education **4 QH**
Surveys the characteristics and the social, emotional, and educational adjustment of individuals with special needs. Reviews legislation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular education settings and also in the community. Introduces principles of instruction and the development of strategies for the generation of Individualized Education Programs (IEPs).

CRS 1314 Introduction to Counseling **4 QH**
Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs **4 QH**
Presents an overview of the etiology and development of disabling conditions and their impacts on infants, children, and youth with special needs. Discusses a variety of biological and environmental risk factors associated with learning problems.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education **4 QH**
Presents the process of assessment, program planning, and implementation for individuals with special needs. Requires students to administer education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation.

CRS 1317 Student Teaching and Seminar in Special Education **8 QH**
Allows for full-time participation in a University-arranged and supervised school program, emphasizing inclusive settings. Gives the student the opportunity to analyze the teaching of and the learning by students with special needs and to demonstrate, evaluate, and develop teaching skills. *Prereq. Advanced professional sequence with minimum 2.5 QPA both overall and in teaching major.*

CRS 1500 Mental Health **4 QH**
Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

CRS 1502 Communicable and Degenerative Diseases **4 QH**
Focuses on the disease immunity process, with emphasis on prevalent communicable diseases in the United States today and their transmission. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other communicable and degenerative diseases and disorders that affect the nation's health.

CRS 1503 Human Sexuality and Family Dynamics **4 QH**
Examines sexuality from a physical, psychological, social, historical, and cultural perspective. Considers sexual needs and concerns about sexuality at various stages in life.

CRS 1510 Health Counseling **4 QH**
Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health professionals in dealing more effectively with various health issues. *Prereq. Middler standing or above.*

CRS 1800 Directed Study **4 QH**
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

Dental Hygiene

DHY courses are open only to Forsyth Dental Hygiene students unless otherwise indicated.

DHY 1100 Oral Anatomy and Histology **3 QH**
Introduces the student to the structures of the oral cavity. Includes the embryology and histology of the head and neck structures with primary emphasis on the oral cavity. Studies the formation, eruption patterns, and morphology of the primary and permanent dentitions.

DHY 1101 Dental Hygiene Orientation 1 **2 QH**
Presents an overview of issues relating to the profession of dental hygiene including historical development with emphasis on the philosophy, responsibilities, and current roles of the dental hygienist as a member of the dental health team. Reviews dental terminology. Covers dental manpower and dental delivery systems. *This course is open to non-dental hygiene majors.*

DHY 1102 Dental Hygiene Orientation 2 **2 QH**
Continues DHY 1101. Presents an overview of the dental hygiene process of care to include assessment, diagnosis, planning, implementation, and evaluation. Covers infection control, medical/dental terminology, and principles of four-handed dentistry. Includes a laboratory component. *This course is open to non–dental hygiene majors.*

DHY 1104 Dental Procedures 1 **3 QH**
Introduces the student to the discipline of dentistry. Reviews dental specialties with attention given to the roles and responsibilities of the dental assistant. Places emphasis on exposure control, four-handed dentistry, and use and manipulation of some dental materials. A laboratory component is included. *This course is open to non–dental hygiene majors.*

DHY 1105 Dental Procedures 2 **4 QH**
Continues DHY 1104. Includes a clinical internship in the Harvard School for Dental Medicine postdoctoral training clinics. Students will have an opportunity to apply skills learned in DHY 1104. *Prereq. DHY 1104. This course is open to non–dental hygiene majors.*

DHY 1204 Head and Neck Anatomy **2 QH**
Provides a clinical study of anatomy of the head and neck. Emphasizes deviations from normal anatomy and the diagnosis and management of these deviations as they relate to the patient. *This course is open to non–dental hygiene majors.*

DHY 1209 Periodontology **3 QH**
Builds upon oral anatomy and pre-clinical dental hygiene concepts presented in the fall quarter. Discusses the histopathology, etiology, and clinical features of periodontal infections. Includes current concepts in risk assessment and diagnostics. Emphasizes diagnosis, treatment planning, and clinical management of periodontal patients. Includes a one-hour seminar.

DHY 1211 Dental Hygiene Theory 1 **2 QH**
Encompasses the fundamentals of the science of dental hygiene. Introduces the basic principles and skills utilized to provide oral health care for the patient.

DHY 1212 Dental Hygiene Theory 2 **2 QH**
Provides the student with information necessary for the dental management and treatment of the medically compromised patient. Discusses the etiology, clinical and oral manifestations, treatment planning, and management considerations for the major medical conditions of concern in dentistry. In addition to assigned readings and lecture information, students will participate in case method projects to facilitate the clinical application of the course material.

DHY 1214 Dental Hygiene Theory 3 **2 QH**
Discusses the dental hygiene management of patients with special developmental/acquired, medical/physical, sensory and/or psychological needs. Includes topic areas of gerodontics disabling/handicapping conditions, major psychiatric diseases, dependency disorders, and the cancer patient. Emphasizes the barriers and access to care, patient management via normalization of care, the use of adaptive aids, preventive techniques, and individualized treatment planning.

DHY 1220 Radiology 1 **2 QH**
Uses lectures, slides, and laboratory experiences to provide the student with a basic knowledge and understanding of radiation biology and hygiene; radiographic image receptors and the developing process; and the fundamentals of dental radiography including the production and projection of X-rays. Emphasizes radiographic surveys by means of the paralleling, bisecting angle, and extra-oral techniques.

DHY 1221 Radiology 2 **1 QH**
Continues DHY 1220. Students refine their skills in producing diagnostically acceptable radiographs. Emphasizes interpreting films for projection, exposure, processing errors, normal radiographic anatomy, and common diseases/anomalies of the teeth and bone.

DHY 1228 Dental Materials **3 QH**
Studies the basic composition and properties of dental materials utilized in dental hygiene practice. Emphasizes the selection, manipulation, and clinical management of dental materials. Examines the relationship between the oral environment and dental materials. Laboratory sessions are integrated with lectures to provide the student with the opportunity to practice various techniques such as mixing cements, pit and fissure sealants, polishing of amalgam and composite restorations, impression taking, and study models.

DHY 1240 Nutrition **2 QH**
Introduces the science of human nutrition based upon the principles of biochemistry. Reviews the nature and function of the micro- and macronutrients essential for health with specific emphasis on the role diet and nutrition play in the prevention of diseases and the promotion of optimum health and oral wellness. *This course is open to non–dental hygiene majors.*

DHY 1301 Introduction to Oral Health Research **3 QH**
Introduces the currently accepted theories and methods of oral health research. Studies research methods, experimental design, and statistical methods with emphasis on dental epidemiology and clinical research. Reviews current dental research from dental journals to evaluate the methods, design, validity, and relevancy of the research on the professions of dentistry and dental hygiene. Discusses future research and advances in technology to help the student gain a perspective on needed research. Funding sources will also be reviewed.

DHY 1308 Pathology **4 QH**
Emphasizes oral pathology. Covers normal structures of the oral cavity, principles of general pathology, including inflammation, neoplasia and diseases/conditions of the oral cavity and its environs, with clinical features, some histopathology, the course of the disease(s), and treatment. Stresses common developmental disorders, cysts of the jaws and neck, caries, pulpitis, other dental defects, mucous membrane pathology, viral, bacterial and fungal diseases, white lesions, benign and malignant oral diseases, pigmented dental and mucosal lesions, allergies, and oral manifestations of systemic diseases.

DHY 1315 Dental Hygiene Theory 5 **2 QH**
Introduces dental specialties through lectures, slides, and case presentations of dental procedures related to individual specialties. Topics presented by guest lecturers include orthodontics, endodontics, oral and maxillofacial surgery, prosthodontics, temporomandibular disorders (TMD), dental implants, maxillofacial prosthetics, pediatric dentistry, and radiovisiography.

DHY 1316 Dental Hygiene Theory 6 **2 QH**
Presents material to assist the dental hygiene student to develop the management skills needed to become an effective and productive member of the dental team. Emphasizes identifying professional goals, developing communication skills, writing résumés, perfecting interviewing techniques, and recognizing employer/employee responsibilities and expectations.

DHY 1317 Dental Hygiene Theory 4 **2 QH**
Presents material that focuses on the preventive services of dental hygiene care. Students will consider the role of the dental hygienist relative to caries control, fluoride recommendations, and dietary counseling. Students will integrate concepts of oral wellness and smoking cessation into client care plans as well as examine the delivery of preventive services to clients. Students will also examine chair-side ergonomics for prevention of occupational injuries to themselves.

DHY 1330 Pharmacology **3 QH**
Places initial emphasis on nomenclature to familiarize the student with the terminology used in pharmacology. Undertakes the study of drugs to acquaint the student with their origin, physical and chemical properties, preparation, modes of administration, and effects upon the body systems. Gives special consideration to those drugs that are of dental value, including antiseptics, antibiotics, pain-relieving drugs, and the anesthetics. *This course is open to non–dental hygiene majors.*

DHY 1331 Pain Control **2 QH**
Introduces the dental hygiene student to the recognition and management of pain, fear, and anxiety associated with dental treatment. Lectures will cover basic and current concepts in pain and anxiety control in dental treatment. *Prereq. Current certification in cardiopulmonary resuscitation and DHY 1330.*

DHY 1332 Pain Control Lab **1 QH**
Elective laboratory taken concurrently with DHY 1331. Allows clinical practice of local anesthesia techniques. Additional clinical practice may be required for state licensing and certification and will occur in DHY 1615 and DHY 1616.

DHY 1361 Public Health **2 QH**
Introduces current principles and issues in public health and their relationship to the delivery of oral health care to the public. Investigates and discusses the principles of epidemiology, health care delivery, biostatistics, allied health utilization, and fluoridation. Provides each student with the opportunity to select one issue in public health and explore it by writing a short position paper.

DHY 1362 Community Health **2 QH**
Examines the topics related to community oral health. Explores the principles of program planning and basic health education methods and materials. Provides each student with the opportunity to work with a population in the community and plan, implement, and evaluate a preventive oral health program according to the needs of that population. This experience may help students to recognize a commitment to the community and to accept the responsibilities of a health care professional.

DHY 1364 Seminar in Legal Issues and Ethics **2 QH**
Provides a profile of the dental hygienist within a legal and ethical framework. Examines state practice acts. Students will explore the responsibilities involved in hygienist/patient and employee/employer relationships. Investigates the legal ramifications of a variety of practice settings. Uses case studies and values clarification models to encourage ethical and professional development.

DHY 1401 Oral Health Gerontology **4 QH**
Introduces the dental hygiene student to oral health gerontology. Reviews the biological, psychological, and social aspects of aging. Places an emphasis on oral tissues. Discusses in detail dental hygiene treatment planning and evaluation for both institutional-

ized and community-based elderly patients. Examines public policy and financing of oral health care for the aged. *Prereq. Extramural experience required.*

DHY 1402 Advanced Public Health **4 QH**
Studies the current issues surrounding today's public health care delivery system in depth. Places emphasis on health legislation both at the state and federal levels. Issues include access to health care, quality assurance/control, and health care costs and financing. Includes evaluation of possible solutions in terms of appropriateness, effectiveness, and economy and a review of health care delivery systems. Students will utilize the principles of oral epidemiology through surveys of specified area populations to develop a health promotion plan.

DHY 1403 Dental Seminars **4 QH**
Reviews the current concepts in dentistry and dental hygiene theory and practice. Discusses the impact of new knowledge on the art and science of dentistry, dental hygiene, and prevention of dental disease. Topics will be determined by current literature and the political and socio-economic climate of the times. Uses integration and sharing of personal experiences and practices relating to dental hygiene to assess and improve student's communication, leadership, decision making, and organizational skills.

DHY 1410 Independent Study **4 QH**
Gives students an opportunity to explore in depth a subject relevant to their interests. Provides the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities.

DHY 1550 Internship **6 QH**
Provides professional field assignment in a setting designed to enhance students in their professional career development. Includes supervision by faculty, conferences with professional staff, and projects. Internship may be spread over more than one academic quarter. A minimum of 180 hours is required.

DHY 1611, DHY 1612 Clinical Dental Hygiene 1 and 2 **3 QH each**
Provides pre-clinical and laboratory instruction in the techniques utilized for the complete evaluation and prophylaxis of patients including instrumentation, polishing, patient evaluation procedures, oral physiotherapy, prevention of disease transmission, medical emergencies, and treatment planning. Pre-clinical activities are coordinated with DHY 1211 and DHY 1212. Actual delivery of patient care begins in DHY 1612. Students will be responsible for patient recruitment. A weekly seminar in DHY 1612 will be conducted for discussion of medically compromised patient cases and patient-management strategies.

DHY 1613 Clinical Dental Hygiene 3 **3 QH**
Provides dental hygiene and other procedures for both adult and child patients in the Forsyth Clinic. Students will be responsible for patient recruitment. A weekly seminar is included for the discussion of patient cases.

DHY 1614, DHY 1615, DHY 1616 **6 QH each**
Clinical Dental Hygiene 4, 5, and 6
Provides clinical experience to the dental hygiene student. Students provide preventive, educational, and therapeutic oral health services as delegated by the Commonwealth of Massachusetts at our dental hygiene clinic to children and adults on an appointment basis. Students will be responsible for patient recruitment. In addition to the clinical training at the Forsyth Dental Center dental hygiene clinic, students supplement this training via extramural rotations at area hospitals, community health care centers, and public health care programs. A weekly one-hour seminar relates dental hygiene theory to clinical practice.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming **1 QH**
Focuses on basic swimming skills for non-swimmers, with emphasis on personal water safety.

HSL 1101 Intermediate Swimming **1 QH**
Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq. HSL 1100 or equivalent.*

HSL 1106 Beginning Scuba **2 QH**
Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq. HSL 1101 or equivalent.*

HSL 1107 Sailing **1 QH**
Focuses on basic skills in sailing. Taught at Community Boathouse. Lab fee.

HSL 1109 Beginning Gymnastics 1 **1 QH**
Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1114 Badminton **1 QH**
Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis **1 QH**
Focuses on basic tennis strokes, concepts, rules, strategies, and game play.

HSL 1124 Beginning Fencing **1 QH**
Focuses on the fundamental principles and techniques of fencing at the beginner level.

HSL 1131 Yoga **1 QH**
Introduces yoga skills and techniques for men and women at the beginning level.

HSL 1132 Weight Training **1 QH**
Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.

HSL 1133 Physical Conditioning **1 QH**
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.

HSL 1134 Aerobic Exercise and Dance **1 QH**
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.

HSL 1138 Beginning Skiing **1 QH**
Focuses on fundamental techniques of downhill skiing. Lab fee.

HSL 1139 Intermediate Skiing **1 QH**
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. *Prereq. HSL 1138.*

HSL 1140 Basketball **1 QH**
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.

HSL 1142 Volleyball **1 QH**
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.

HSL 1150 Soccer **1 QH**
Focuses on knowledge and skill appropriate to play soccer at the beginning level.

HSL 1153 Modern Dance 1 **1 QH**
Introduces modern dance technique and style.

HSL 1154 Modern Dance 2 **1 QH**
Continues HSL 1153, with progression to more complex modern dance techniques and combinations. *Prereq. HSL 1153 or equivalent.*

HSL 1155 Modern Dance 3 **1 QH**
Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. *Prereq. HSL 1154 or equivalent.*

HSL 1156 Ballet 1 **1 QH**
Introduces ballet fundamentals, with emphasis on alignment.

HSL 1157 Ballet 2 **1 QH**
Continues HSL 1156, with emphasis on developing lyrical style. *Prereq. HSL 1156 or equivalent.*

HSL 1159 Jazz Dance 1 **1 QH**
Introduces the fundamentals of jazz dance, with emphasis on alignment.

HSL 1160 Jazz Dance 2 **1 QH**
Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. *Prereq. HSL 1159 or equivalent.*

HSL 1163 Ballroom Dance **1 QH**
Introduces traditional and contemporary partner dancing.

HSL 1164 Ballroom Dance 2 **1 QH**
Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. *Prereq. HSL 1163.*

HSL 1167 Beginning Racquetball **1 QH**
Focuses on knowledge and skills appropriate to play racquetball at the beginning level.

HSL 1180 Health and Physical Education in the Elementary School **4 QH**
Focuses on introductory knowledge and skills necessary for teaching health and physical education to elementary school children. Emphasizes the importance of the elementary school years for health promotion and positive health behaviors, motor skill development, the implications of health-related fitness, and activities that maximize participation for children in vigorous activity promoting wellness. *Replaces HSL 1151.*

HSL 1254 First Aid **2 QH**
Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.

HSL 1270 Health and Motor Development in Early Childhood **4 QH**
Focuses on social, cognitive, and physical aspects influencing health and motor development in preschoolers and across the life span. Emphasizes the importance of the early childhood years for health promotion and positive health behaviors. Studies the development of fundamental motor patterns (walking, running, catching, throwing, striking, climbing, etc.) including perceptual-motor implications. Provides an opportunity to work directly with a preschooler in a laboratory setting observing and assessing fundamental motor patterns and health behaviors. *Replaces HSL 1265.*

HSL 1286 Nutrition **4 QH**
Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.

HSL 1325, HSL 1326, HSL 1327 **1 QH each**
Dance Rehearsal and Performance 1, 2, 3
Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq. Permission of instructor.*

HSL 1463 Overview of Physical Disabilities **4 QH**
Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.

HSL 1511 Independent Study 1 **1 QH**

HSL 1512 Independent Study 2 **2 QH**

HSL 1513 Independent Study 3 **3 QH**

HSL 1514 Independent Study 4 **4 QH**
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.

HSL 1599 Theory of Coaching **4 QH**
Provides students with the opportunity to study and analyze learning principles, leadership skills, sociology, and psychology as applied to coaching teams and individuals. Focuses primarily on athletes of junior and senior high school age.

HSL 1600 Psychology of Sport **2 QH**
Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq. Physical education major or permission of instructor.*

HSL 1601 Sociology of Sport **2 QH**
Studies sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.

HSL 1777 Honors Adjunct **1 QH**
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.

Medical Laboratory Science

MLS 1101 Medical Laboratory Science Orientation 1 **1 QH**
Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2 **1 QH**
Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1104 Laboratory Techniques **3 QH**
Covers the principles and theories of basic technical skills needed to work competently in a clinical or research laboratory. Discusses issues concerning laboratory safety, aseptic technique, OSHA regulations, quality control, quality assurance, solution preparation, and method evaluation and applies them in a laboratory component. *Prereq. CHM 1122, or concurrently.*

MLS 1109 Foundations of Clinical Laboratory Science **4 QH**
Examines basic lab methods employed in primary care, including urinalysis, Gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq. Admission to physician assistant program or permission of instructor.*

MLS 1112 Renal Physiology and Urinalysis **2 QH**
Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. *Prereq. BIO 1109 and CHM 1111.*

MLS 1125 Hematology **4 QH**
Examines basic hematology procedures and principles. Emphasizes hematopoiesis, hematologic cell maturation, normal and abnormal cell morphology, basic hemostasis, and coagulation testing. *Prereq. BIO 1109, CHM 1122, MLS 1104, or permission of instructor.*

MLS 1132 Immunohematology **3 QH**
Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. *Prereq. BIO 1109, BIO 1172, or permission of instructor.*

MLS 1145 Microbiology **4 QH**
Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. *Prereq. BIO 1109, CHM 1122, and MLS 1172.*

MLS 1152 Clinical Chemistry and Instrumentation **4 QH**
Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. *Prereq. CHM 1122, MLS 1104, and MLS 1112.*

MLS 1172 Immunology **2 QH**
Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and non-specific host response. Covers common laboratory methods for the detection of antigens and antibodies. *Prereq. BIO 1109 and CHM 1122.*

MLS 1212 Urinalysis Laboratory **1 QH**
Laboratory for MLS 1112.

MLS 1225 Hematology Laboratory **1 QH**
Laboratory for MLS 1125.

MLS 1232 Immunohematology Laboratory **1 QH**
Laboratory for MLS 1132.

MLS 1245 Microbiology Laboratory **1 QH**
Laboratory for MLS 1145.

MLS 1252 Clinical Chemistry and Instrumentation Laboratory **1 QH**
Laboratory for MLS 1152.

MLS 1412 MLT Special Topics—Applied Microscopy **2 QH**
Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT (NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1423 MLT Applied Study in Hematology **2 QH**
Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1432 MLT Applied Study in Blood Banking **2 QH**
Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1442 MLT Applied Study in Clinical Microbiology **2 QH**
Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)- level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1452 MLT Applied Study in Clinical Chemistry **2 QH**
Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)- level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1480 MLT Seminar 1 **2 QH**
Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation.

Examines basic use of quality control. *Prereq. Admission to MLT Clinical Program.*

MLS 1523 Hematology MT Applied Study **4 QH**
Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1533 Immunohematology MT Applied Study **4 QH**
Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1544 Clinical Microbiology MT Applied Study **7 QH**
Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1552 Clinical Chemistry MT Applied Study **7 QH**
Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1573 Clinical Immunology MT Applied Study 1 **1 QH**
Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1574 Clinical Immunology MT Applied Study 2 **1 QH**
Continues MLS 1573.

MLS 1601 Foundations of Forensic Laboratory Science **4 QH**
Introduces students to the basis for genetic and chemical analysis of forensic evidence. Presents basic scientific information about the technologies on which DNA testing and identification of drugs of abuse are based. Provides students with the basic understanding of how these specific scientific technologies are used in forensic investigations, how the evidence is collected, and how the scientific results are used in court to provide information to those who are charged with determining guilt or innocence. Uses specific case studies to illustrate certain points.

MLS 1621 Advanced Hematology 1 **3 QH**
Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq. MLS 1125 or permission of instructor.*

MLS 1623 Special Topics: Hemostasis **1 QH**
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq. MLS 1125 or permission of instructor.*

MLS 1631 Advanced Immunohematology **2 QH**
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq. MLS 1132.*

MLS 1648 Advanced Clinical Microbiology **4 QH**
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. *Prereq. MLS 1145 and MLS 1245.*

MLS 1649 Medical Parasitology and Mycology **3 QH**
Discusses the parasites and fungi that are pathogenic to man, including pathogenesis, relevant clinical symptoms, and diagnostic criteria. Emphasizes the laboratory procedure used in their diagnosis and organism characteristics used for identification. *Prereq. BIO 1109, MLS 1145, and MLS 1245.*

MLS 1656 Advanced Clinical Chemistry **4 QH**
Discusses advanced principles of clinical chemistry and some instrumentation, as well as acquisition, management, and application of laboratory data. Studies methods of quantitating clinically significant analytes, including pathophysiology of related disease states. *Prereq. BIO 1109, CHM 1265, and MLS 1152.*

MLS 1661 Medical Laboratory Science Education **2 QH**
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq. Concurrent with Quarter 8 of MLS program.*

MLS 1662 Clinimetrics **2 QH**
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq. Permission of instructor.*

MLS 1665 Medical Laboratory Management **2 QH**
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq. Concurrent with MT clinical applied study.*

MLS 1672 Immunopathology **3 QH**
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq. MLS 1172.*

MLS 1680 MLS Special Topics **2 QH**
Discusses current topics in the clinical lab. *Prereq. Permission of instructor.*

MLS 1681 MLS Senior Seminar **2 QH**
Reviews current undergraduate medical lab science topics.

MLS 1890 Undergraduate Research **2 QH**
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq. Permission of instructor.*

MLS 1891 MLS Current Concepts **1 QH**
Discusses topics determined by recent advances in medical lab science.

Pharmacy

PAH 1101 Health Career Seminar **1 QH**
Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation. Allows students to gather information about the five majors within the Bouvé College of Pharmacy and Health Sciences.

PAH 1135 Professional Dynamics in the Health-Care Delivery System **4 QH**
Examines the evolution of the American health-care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1 **5 QH**
Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq. CHM 1122 or BIO 1142, and BIO 1109.*

PAH 1204 Anatomy-Physiology 2 **5 QH**
Covers structure and function of the various life-supportive systems not covered in the first quarter. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq. PAH 1202 or permission of instructor.*

PAH 1210 Anatomy-Physiology 1 **4 QH**
Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq. MLS majors or permission of instructor.*

PAH 1211 Anatomy-Physiology Laboratory 1 **1 QH**
Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq. Permission of instructor.*

PAH 1212 Anatomy-Physiology 2 **4 QH**
Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq. Permission of instructor.*

PAH 1213 Anatomy-Physiology Laboratory 2 **1 QH**
Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq. Permission of instructor.*

PAH 1280 Biochemistry **5 QH**
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq. BIO 1109 and CHM 1269.*

PAH 1405 Alternative Medicine **4 QH**
Presents an objective discussion of the alternative medical methods. Emphasizes theory of alternative methods, principles of treatment, and the effects of alternative methods. Discusses the complete theory of homeopathy and Chinese medicine and the possible physiological and biochemical explanations of the beneficial effects of alternative methods.

PAH 1776 Junior/Senior Honors Thesis **4 QH**
Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq. Honors participation.*

PAH 1777 Honors Adjunct **1 QH**
Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (1 NI) or PAH honors adviser. *Prereq. Honors participation and permission of instructor.*

PCL 1306 Pharmacodynamics 1 **2 QH**
Introduces pharmacologic principles, with the individual pharmaceuticals of drug groups and individual pharmaceuticals of particular importance in the diagnosis and treatment of disease. Focuses primarily on the applications of such principles and agents to the nursing profession. *Prereq. BIO 1120, BIO 1164, CHM 1105, and CHM 1106.*

PCL 1307 Pharmacodynamics 2 **2 QH**
Continues the topics introduced in PCL 1306. *Prereq. PCL 1306.*

PCL 1409 Pharmacology for the Respiratory-Care Practitioner **4 QH**
Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner. *CPS students only or permission of instructor. Prereq. PAH 1202 and PAH 1204.*

PCL 1420 Pharmacology/Medicinal Chemistry 2 **6 QH**
Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq. PMC 1419 and middler standing.*

PCL 1422 Pharmacology/Medicinal Chemistry 3 **6 QH**
Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autacoids, and antineoplastics. *Prereq. PCL 1420 and junior standing.*

PCL 1453 Experimental Design in Pharmacology **1 QH**
Examines the scientific process through which new drugs are discovered, with emphasis on critical assessment of experimental variability. Compares and contrasts laboratory studies in reductionist systems with clinical trials in human patients. Provides students with the opportunity to learn how to locate, evaluate, and explain technical information pertinent to pharmacy through individual library research projects, student discussions, and a term paper. *Prereq. PMC 1419 and middler standing.*

PCL 1801, PCL 1802, PCL 1803 **4 QH each**
Special Research Project (Pharmacology)
Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor and program director.*

PCT 1240 Pharmaceutical Calculations **4 QH**
Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceutics and for improving problem-solving skills using computers. *Prereq. BIO 1109, CHM 1122, and MTH 1108.*

PCT 1300 Dosage Forms **4 QH**
Focuses on the formulation and administration of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Formerly PCT 1350 Pharmaceutics 2. Prereq. MTH 1108, PHY 1203, CHM 1269, PAH 1280, and PCT 1240 or concurrent enrollment and middler standing.*

PCT 1320 Dosage Forms Laboratory **2 QH**
Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. Lab fee. *Formerly Pharmaceutics Laboratory 2. Prereq. PCT 1240 and PCT 1300 or concurrent enrollment and middler standing.*

PCT 1340 Physical Pharmacy **4 QH**
Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, coarse dispersion, diffusion and membrane transport, and chemical kinetics. *Formerly Pharmaceutics 1. Prereq. PCT 1300, PCT 1320, and middler standing.*

PCT 1360 Physical Pharmacy Laboratory **2 QH**
Focuses on the physiochemical principles and techniques of pharmaceutal preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. *Formerly Pharmaceutics Laboratory 1. Prereq. PCT 1300, PCT 1320, and PCT 1340 or concurrent enrollment and middler standing.*

PCT 1440 Biopharmaceutics/Pharmacokinetics **4 QH**
Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses the general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq. MTH 1108, PAH 1204, PAH 1280, PCT 1240, PCT 1300, PCT 1320, PCT 1340, PCT 1360, and junior standing.*

PCT 1801, PCT 1802, PCT 1803 **4 QH each**
Pharmaceutics Special Research Project
Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor(s) and program director.*

PHP 1102 The Profession of Pharmacy **2 QH**
Introduces pharmacy freshman students to the profession of pharmacy. Discusses pharmacist roles in health-care delivery, pharmacy demographics, drug component of health care, pharmacy education, pharmacy law, ethics and professionalism, and professional pharmacy associations.

PHP 1301 Pharmaceutical Jurisprudence **4 QH**
Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq. Junior standing.*

PHP 1302 Pharmacy Administration 1 **4 QH**
Covers contemporary administrative aspects of pharmacy: trends in contemporary practice, third-party payment plans, macroeconomic impact on the profession, and the impact of current health care issues on pharmacy. *Prereq. Senior standing or permission of instructor.*

PHP 1303 Interpersonal Skills for Health Professionals **4 QH**
Applies the skills of interpersonal communication to situations encountered in various health-care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings. *Prereq. Pharmacy and dental hygiene majors only.*

PHP 1314 Pharmacy Care Management **4 QH**
Focuses on the managerial and administrative skills required by a contemporary pharmacist practicing in either a community or hospital setting. Discusses classical management principles of planning, decision making, organizing, hiring, and controlling. Covers aspects of managing pharmacy business growth such as marketing, market research, advertising, pricing, reimbursement, resource utilization, and inventory control. Uses a case study method throughout as an interactive teaching tool. Incorporates in lectures and case materials current events in pharmacy, future characteristics of pharmacy practice, national health care, quality assurance, and risk management. *Prereq. Senior standing or permission of instructor.*

PHP 1401 Drug Information and Evaluation **3 QH**
Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand, interpret and evaluate the medical and pharmaceutical literature. *Prereq. Junior standing or permission of instructor.*

PHP 1402 Parapharmaceuticals **2 QH**
Focuses on the nature and application of various surgical devices, appliances, bandages, home health care products, and hospital and sickroom supplies and on monitoring equipment in the provision of pharmacy care. *Prereq. Senior standing.*

PHP 1411 Pathophysiology **4 QH**
Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq. PAH 1202, PAH 1204 or concurrent enrollment, and middler standing.*

PHP 1441 Therapeutic Drug Monitoring **4 QH**
Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq. PCT 1440 and junior standing.*

PHP 1501 Ambulatory Pharmacy Externship **4 QH**
Involves a 400-hour (10 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq. PHP 1301, PHP 1601, and PHP 1609.*

PHP 1503 Professional Practice Laboratory **1 QH**
Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of therapy. *Prereq. PHP 1301, PHP 1601, and PHP 1609.*

PHP 1505 Hospital Pharmacy Externship **4 QH**
Provides students with the learning experience needed to develop competency in the delivery of pharmacy services within a hospital setting. The student will receive information and hands-on experience in all phases of inpatient and outpatient dispensing; monitoring drug utilization; hospital committee activities; utilizing hospital reference material; and hospital managerial skills and procedures. *Prereq. PHP 1609 and senior standing. Taken at the same time as PHP 1506.*

PHP 1506 Clinical Pharmacy Clerkship **8 QH**
Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq. PHP 1609 and senior standing.*

PHP 1601 Nonprescription Medication **4 QH**
Provides an overview of the types of over-the-counter (OTC) medications. Discusses correct use precautions and adverse effects in a variety of patient populations. Addresses the issue of counseling different types of patients. *Prereq. Junior standing.*

PHP 1603 Selected Topics in Clinical Pharmacy 1 **4 QH**
Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq. Permission of instructor.*

PHP 1604 Selected Topics in Clinical Pharmacy 2 **4 QH**
Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq. Permission of instructor.*

PHP 1605 Introduction to Sterile Products **4 QH**
Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq. Junior or senior pharmacy majors only or permission of instructor.*

PHP 1607 Cancer Chemotherapeutics **4 QH**
Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq. Fourth-year pharmacy major or permission of instructor.*

PHP 1609 Pharmacotherapeutics **6 QH**
Examines the drug therapies of the major disease states. Covers selected cardiovascular, respiratory, hepatic, renal, and endocrine disorders. *Prereq. PCL 1420, PCL 1422, PCT 1440, PHP 1411, PMC 1419, PMC 1421, and junior standing.*

PHP 1612 Special Topics in Pharmacy Administration **2 QH**
Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq. Junior or senior pharmacy majors only.*

PHP 1614 Special Topics in Pharmacy Administration **4 QH**
Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq. Junior or senior pharmacy majors only.*

PHP 1615 Clinical Immunology **3 QH**
Reviews the fundamentals of basic immunology, including humoral and cell-mediated immunity, the major histocompatibility complex (MHC), and cytokines, then progresses to in-depth discussion of immunological diseases and disorders, including hypersensitivity, infectious disease, congenital and acquired immunodeficiencies including AIDS, cancer immunology, transplantation, and autoimmunity. Discusses various important immunotherapeutic modalities, including monoclonal antibodies, cytokines, and recombinant DNA technology products. *Prereq. PharmD student or permission of instructor.*

PHP 1801, PHP 1802, PHP 1803, PHP 1804 **4 QH each**
Special Research Project
Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq. Permission of instructor.*

PHP 1805 Special Research Project **3 QH**
Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq. Permission of instructor.*

PHP 1806 Special Research Project **2 QH**
Same as PHP 1805.

PMC 1322 Pharmaceutical Biotechnology **3 QH**
Introduces the principles of immunology and molecular biology and discusses their applications to the design, development, and use of biopharmaceuticals and to gene insertion therapies. Topics include small and large peptides, antibodies, and growth factors. *Prereq. PAH 1202 (or concurrent enrollment), PAH 1280, CHM 1269.*

PMC 1419 Medicinal Chemistry/Pharmacology 1 **5 QH**
Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, antipsychotics, and opioid analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq. BIO 1109, CHM 1269, PAH 1202, PAH 1204 (or concurrent enrollment), PAH 1280, and middler standing.*

PMC 1421 Antiinfectives **5 QH**
Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq. BIO 1121, PAH 1280, PMC 1419, and junior standing.*

PMC 1801, PMC 1802, PMC 1803 **4 QH each**
Special Research Project (Medicinal Chemistry)
Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor and program director.*

PMD 1100 Introduction to the Profession of Pharmacy **2 QH**
Introduces pharmacy freshman students to the profession of pharmacy. Discusses pharmacist roles in health care delivery, pharmacy demographics, drug component of health care, pharmacy education, pharmacy law, ethics and professionalism, and professional pharmacy associations. *Prereq. First year of the Pharm.D. curriculum.*

PMD 1102 Introduction to Pharmacy Practice **1 QH**
Serves as an introduction to the technical knowledge and skills required in both community and institutional pharmacy practice. *Prereq. First year of the Pharm.D. curriculum.*

PMD 1300 Biochemistry **5 QH**
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109, and CHM 1269.*

PMD 1301 Health-Care Systems **4 QH**
Examines the evolution of the American health-care delivery system from the early forms of organized institutional health care through the dynamic, and increasingly integrated and managed-care system of the present health-care industry. Examines the interaction of regulatory, economic, political, and social aspects with particular emphasis on pharmacy practice. Discusses current proposals for health reform and various state initiatives as well as international examples. Considers the impact and consequence of actions in one era on the structure and function of health care in later years. *Prereq. Third year of the Pharm.D curriculum or permission of instructor.*

PMD 1302 Communications Skills for Pharmacists **4 QH**
Introduces practical communications skills used in pharmacy practice settings, focusing on group discussion, interpersonal communication, medication counseling, and public speaking. Practices and critiques language, listening, nonverbal communication, self-monitoring, group problem-solving, and presentation skills. Students are expected to participate in a group discussion, write a paper on interpersonal communication, conduct a patient counseling session, and present a speech using rhetorical techniques and visual aids to explain clearly a technical process or concept. *Prereq. Third year of the Pharm.D. curriculum.*

PMD 1303 Human Physiology 1 **4 QH**
Provides students with an understanding of the principles of physiology. Discusses physiological information mostly related to cell physiology, muscle physiology, and physiology of the nervous system. Focuses on the physiological mechanisms of the major organ systems. Physiological information will be related to the specific areas of pharmacology. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109.*

PMD 1304 Human Anatomy **1 QH**
Provides students with the knowledge of anatomy in a laboratory setting. Focuses on anatomical structures of the major organ systems. Emphasizes structure-functional relationship. Study of gross anatomy will be aided by computer programs and by microscopy of the available histology slides. Physiological information will be related to the specific areas of anatomy. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109.*

PMD 1310 Immunology **4 QH**
Presents and discusses the fundamentals of basic immunology, including the properties of the immune response, the cells and tissues involved in the immune system, major histocompatibility complex, T-cell activation, B-cell activation and antibody structure, cytokines, complement, immune response regulation, as well as selected immunological disease states and potential immunotherapeutic options. Consists of lectures and a weekly section in which primary literature will be discussed and analyzed, and patient cases may be discussed. *Prereq. Third year of the Pharm.D. curriculum, PMD 1300.*

PMD 1311 Pathophysiology 1 **4 QH**
Examines the mechanisms of human disease, emphasizing fundamental principles of cellular biology. Dedicates early sessions to understanding normal cell biology, cell vulnerabilities, and cellular responses to injury. Discusses systemic responses to injury including inflammation, immunity, and hemostasis. A detailed discussion of oncogenesis is followed by a system-by-system review of disease states. *Prereq. Third year of the Pharm.D. curriculum, PMD 1300, and PMD 1303.*

PMD 1312 Human Physiology 2 **4 QH**
Provides students with an understanding of the principles of physiology. Discusses physiological information mostly related to cardiovascular, respiratory, digestive, urinary, and endocrine systems. Focuses on the physiological mechanisms of the major organ systems. Physiological information will be related to the specific areas of pharmacology. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109, PMD 1303, PMD 1304.*

PMD 1313 Human Physiology Laboratory **1 QH**
Focuses on physiology of the major organ systems. Students actively participate in discussions concerning physiological functions of the organ systems. Interactive CD-ROMs allow each student to study in-depth the functioning of each organ system. Structure-functional relationship is stressed where physiological information is related to the specific areas of pharmacology. *Prereq. Third year of the Pharm.D. curriculum, PMD 1303, PMD 1304, and PMD 1312 (concurrent).*

PMD 1320 Medical Microbiology and Antimicrobial **5 QH**
Reviews the structure and physiology of bacteria, fungi, parasites, and viruses, and then surveys the members of each of these groups of organisms that commonly colonize and/or cause significant disease in humans. The survey focuses on human organ systems such as skin and mucous membranes, gastrointestinal, respiratory, and urinary tracts, central nervous system, blood and lymphatics, and others. As the students develop knowledge of microorganisms that cause disease of each of these organ systems, the chemistry of available antimicrobial therapeutic agents will be introduced, and this information integrated with a reminder of the relevant microbial target enzyme or physiological process. When possible, demonstration cultures of microorganisms will be made available to students, and computer study guides or kodachrome slide sets will be available for review. *Prereq. Third year of the Pharm.D. curriculum, PMD 1300 and PMD 1310.*

PMD 1321 Pathophysiology 2 **4 QH**
Builds on the principles begun in PMD 1311 and examines the mechanisms of human disease, emphasizing fundamental principles of cellular biology. Involves a system-by-system review of the disease state, including renal disease, fluid and electrolyte disorders, gastrointestinal, neurological, and musculoskeletal diseases. *Prereq. Third year of the Pharm.D. curriculum, PMD 1311, and PMD 1303.*

PMD 1322 Pharmaceutical Calculations **2 QH**
Students will investigate the application of mathematical concepts in pharmacy. Emphasizes improving problem-solving skills, learning systems of measurement, and performing basic arithmetic calculations as they relate to the practice of pharmacy. Computer-aided instruction is available. *This course is a module, intended to be taken in conjunction with PMD 1323. Prereq. Third year of the Pharm.D. curriculum, MTH 1108, CHM 1269, and PMD 1300.*

PMD 1323 Dosage Forms **4 QH**
Focuses on the formulation and administration of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Prereq. Third year of the Pharm.D. curriculum, MTH 1108, PHY 1203, CHM 1269, and PMD 1300.*

PMD 1324 Pharmacy Care 1 **1 QH**
Provides an opportunity for students to reflect upon their co-op experience and share their experiences with faculty and their peers. Focuses on improving the communication skills of the student. Students are expected to complete a written paper, an oral presentation, and a listening assignment. Students will gain an understanding of the various co-op opportunities that are available to them from discussions with their peers. Students will also gain an understanding of many workplace issues that they may encounter during their co-op periods of study. *Prereq. Middler year co-op.*

PMD 1501 Advanced Pathophysiology/Pharmacotherapeutics 1 **5 QH**
Examines the pathophysiology of major disease states as it relates to the development of a patient-oriented pharmacotherapeutic plan. Emphasizes the role of pathophysiology, etiology, clinical signs and symptoms, and diagnosis in the selection, initiation, and monitoring of therapeutic drug regimens. Allows students to develop skills in case evaluation by the application of lecture material to patient-specific cases through weekly seminars. Covers cardiology, nephrology, and hepatology. *Prereq. PharmD tracking students.*

PMD 1502 Advanced Pathophysiology/Pharmacotherapeutics 2 **5 QH**
Continues discussions introduced in PMD 1501. Covers infectious disease (module 1), pulmonary, neurology, nutrition, and gastrointestinal diseases. *Prereq. PMD 1501.*

PMD 1503 Advanced Pathophysiology/Pharmacotherapeutics 3 **5 QH**
Continues discussions introduced in PMD 1501 and PMD 1502. Covers infectious disease (module 2), AIDS, pediatrics and neonatology, and obstetrics and gynecology. *Prereq. PMD 1502.*

PMD 1511 Pharmacy Research and Evaluation **3 QH**
Covers aspects of experimental design and hypothesis testing. Uses critical reading of clinical trials, cohort and retrospective studies, and health services research articles to illustrate principles of research design and conduct. Students will be expected to complete a research protocol. *Prereq. PharmD tracking students.*

PMD 1512 Biometrics **2 QH**
Explores the fundamental principles of experimental design and statistical analysis, emphasizing biomedical research. Topics include probability distributions, descriptive statistics, hypothesis testing, correlation, regression, and chi-square testing. *Prereq. PharmD tracking students.*

PMD 1515 Pharmacoeconomics **3 QH**
Applies various pharmacoeconomic techniques to an analysis of drug therapy and other pharmacy-related issues. Examines the role of quality of life and therapeutic outcomes in pharmacoeconomic studies. Investigates the value of pharmacoeconomic studies *Prereq. PharmD tracking students.*

PMD 1600 Institutional Experience **4 QH**
Provides experiential rotation in a contemporary institutional setting where students have the opportunity to further develop knowledge of and demonstrate pharmacy practice skills. Focuses on delivery of patient-oriented care, management and evaluation of pharmacy operations and medication distribution systems, and provision of additional professional services. *Prereq. PMD 1503 and sixth-year PharmD tracking student status.*

PMD 1601, PMD 1602, PMD 1603, PMD 1604 **9 QH each**
Clinical Clerkship 1,2,3,4
Provides experiential rotations in specialty areas of contemporary pharmacy practice where students can apply knowledge to delivery of patient care. Offers students the opportunity to demonstrate skills in areas of communication, critical thinking and problem-solving, and patient-oriented care through observation and performance. *Prereq. PMD 1503 and sixth-year PharmD tracking student status.*

Physical Therapy

PTH 1001 Basic Physical Therapy Procedures **4 QH**
Offers a basic practical understanding of patient care procedures used in physical therapy practice, including body mechanics, therapeutic positioning, patient ambulation and transfer techniques, and range of motion exercises. Introduces physical therapy students to cooperative education and its implications for career planning in physical therapy. Covers self-assessment, résumé writing, and interviewing skills.

PTH 1118 Developmental Basis of Human Performance **4 QH**
Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1202 Therapeutic Modalities in Physical Therapy Practice **3 QH**
Provides practice in preparing patients and equipment for various treatment procedures using physical agents. Includes theory, demonstration, and practice in applying heat and cold modalities, hydrotherapy, ultraviolet and laser light therapies, and electrotherapy. *Prereq. PTH 1001.*

PTH 1252 Clinical Gross Anatomy 1 **3 QH**
Covers the structure and function of the head, neck, and trunk regions of the human body with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems and clinical application to these systems. *Prereq. BIO 1162, BIO 1163, and BIO 1164.*

PTH 1253 Clinical Gross Anatomy 2 **3 QH**
Covers the structure and function of the extremities of the human body with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems and clinical application to these systems. *Prereq. BIO 1162, BIO 1163, and BIO 1164.*

PTH 1310 Clinical Gross Anatomy **6 QH**
Covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver prosection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq. BIO 1152, BIO 1153, and BIO 1154. AT students only.*

PTH 1316 Neuromuscular Physiology **4 QH**
An in-depth study of neuromuscular physiology, motor control, and motor learning, with applications to physical therapy practice. *Prereq. BIO 1152, BIO 1153, BIO 1154, and PTH 1202.*

PTH 1320 Soft Tissue Mobilization **2 QH**
Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq. BIO 1254, BIO 1255, CPS 1615, PTH 1202, PTH 1252.*

PTH 1325 Clinical Medicine 1 **4 QH**
Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq. BIO 1152, BIO 1153, and BIO 1154.*

PTH 1330 Clinical Kinesiology **5 QH**
Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq. PTH 1252, PTH 1253, and PTH 1316.*

PTH 1335 Musculoskeletal Evaluation **3 QH**
Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1320.*

PTH 1341 Musculoskeletal Therapeutic Exercise **5 QH**
Explores the theory, planning, and practice of basic therapeutic exercise. Discusses musculoskeletal as well as basic cardiovascular principles. Offers the opportunity to apply principles from other professional courses to design treatment programs using a systematic, problem-solving approach. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1345 Orthopedic Clinical Medicine 2 **3 QH**
Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1325.*

PTH 1352 Psychosocial Aspects of Illness **3 QH**
Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1356 Prosthetics **1 QH**
Studies theory, demonstration, and current practice in prosthetics. *Prereq. PTH 1252, PTH 1253, PTH 1316, PTH 1330, PTH 1335, PTH 1341, and PTH 1345.*

PTH 1360 Neurological Therapeutic Exercise **4 QH**
Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1330.*

PTH 1361 Neurological Assessment and Adult Neurology **3 QH**
Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1330.*

PTH 1366 Neuroanatomy **5 QH**
Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq. PTH 1252 and PTH 1253.*

PTH 1370 Clinical Seminar **2 QH**
Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1380 Supervised Clinical Education 1 **5 QH**
Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1386 Pediatric Neurology **2 QH**
Focuses on the pediatric and neurologic aspects of physical therapy practice. Reviews symptoms, conditions, and therapeutic/medical intervention. *Prereq. PTH 1118, PTH 1252, PTH 1253, and PTH 1316.*

PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy **4 QH**
Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardiopulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders, and physical therapy management. *Prereq. Physical therapy students who have satisfactorily completed all prior professional courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.*

PTH 1392 Pathophysiology and Clinical Therapeutics **1 QH**
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1396 Pediatric Evaluation/Treatment **2 QH**
Explores evaluating and treating the motor aspects of the neuromuscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1400 Administration **4 QH**
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq. PTH 1380.*

PTH 1405 Research for Physical Therapy **4 QH**
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1411 Clinical Integration **4 QH**
Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis on rationale and selection of treatment alternatives. Uses case study format and case simulations. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1415 Supervised Clinical Education 2 **0 QH**
Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1416 Supervised Clinical Education 3 **0 QH**
Continues PTH 1415. Provides an additional clinical assignment that gives students the opportunity to further refine their clinical skills under the supervision of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq. Satisfactory completion of PTH 1415.*

PTH 1420 Physical Therapy in the Health Care System **3 QH**
Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq. PTH 1370 and PTH 1380.*

PTH 1426 Functional Aspects of Aging **3 QH**
Discusses the interaction of psychological, social, and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq. PTH 1370 and PTH 1380.*

PTH 1453 Advanced Musculoskeletal Assessment and Treatment **3 QH**
Provides an opportunity to develop knowledge and skills in evaluating and treating joint dysfunction. Uses a problem-solving approach. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1602 Special Topics in Physical Therapy **2 QH**
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy **4 QH**
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct **1 QH**
Constitutes an addition to any three, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study **2 QH**
Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq. Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing **4 QH**
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Hearing Science **4 QH**
Presents basic concepts related to the physics of sound and an in-depth study of the anatomy and physiology of the normal hearing mechanism. Discusses basic principles of psychophysics of audition.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms **4 QH**
Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq. SLA 1101.*

SLA 1300 Language Acquisition **4 QH**
Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq. SLA 1101.*

SLA 1301 Phonetics **4 QH**
Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition. *Prereq. SLA 1101 and SLA 1201.*

SLA 1303 Introduction to Audiology **4 QH**
Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 1400 Speech Science **4 QH**
Offers an examination of the basic sciences involved in speech and audition. Includes an in-depth study of the analysis of sound and the acoustic composition of speech. Emphasizes review of current theory and research in speech reception, perception, and production.

SLA 1403 Clinical Procedures in Speech and Language **4 QH**
Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1460 Neurological Bases of Communication **4 QH**
Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study **4 QH**
Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

SLA Speech Pathology 1 **4 QH**
Presents models of developmental speech, language, and communication impairments. Includes such topics as specific language impairments, articulation/phonological disorders, dysfluency, and language-based learning problems. Stresses common clinical processes associated with the management of these and other disorders. *Prereq. SLA 1101, SLA 1201, SLA 1300, and SLA 1301.*

SLA Speech Pathology 2 **4 QH**
Focuses on organic and acquired speech, language, and communication disorders. Emphasizes clinical problem-solving for disorders such as voice, craniofacial anomalies, aphasia and related neurogenic disorders, and cerebral palsy. *Prereq. Speech Pathology 1 and associated prerequisites.*

SLA Clinical Procedures in Audiology **4 QH**
Familiarizes students with audiological procedures used in a variety of settings, including hospitals, clinics, and school systems. Covers case history, case reporting, and contemporary issues in audiology. Focuses on assessment and on habilitation/rehabilitation as it relates to audiometric interpretation. Requires observation of a wide variety of clinical cases. *Prereq. SLA 1101, SLA 1200, and SLA 1303.*

SLA Speech-Language Pathology and Audiology Services in the Schools **4 QH**
Covers assessment and intervention approaches by speech-language pathologists and audiologists in school settings. Addresses the impact of communication and hearing problems on academic performance and the interface between language abilities and reading and writing. Includes consideration of the assessment and management of learning disabilities, specific language impairment and central auditory processing disorders, and the increasing impact of these problems as children progress through the curriculum. Additional topics include metalinguistic skills, narrative and other scripted knowledge, the relationship of oral to written language, and discourse skills. Provides students with the opportunity to develop the ability to intervene with these populations using a classroom-based approach. Incorporates issues associated with classroom integration, the cultural bases of language differences, and team-based clinical management.

SLA Seminar in Speech-Language Pathology and Audiology **4 QH**
Focuses on advanced theoretical and clinical topics in speech-language pathology and audiology as they relate to issues associated with enrollment in an externship. Students are expected to present case studies and participate in problem-based learning situations as a means of facilitating critical thinking and problem-solving associated with clinical management. Presents various topical issues ranging from changes in the health-care environment to awareness and appreciation of cultural factors.

Toxicology

TOX 1100 Toxicology Orientation **1 QH**
Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology **1 QH**
Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology **4 QH**
Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq. PMC 1418.*

TOX 1301 Fundamental Principles of Systemic Toxicology **4 QH**
Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq. PMC 1418.*

TOX 1302 Chemical and Analytical Toxicology **4 QH**
Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq. PMC 1418 and TOX 1301.*

TOX 1322 Biochemical Toxicology Laboratory **4 QH**
Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq. TOX 1300, TOX 1301, or TOX 1302.*

TOX 1811, TOX 1812, TOX 1813 Toxicology Research **4 QH each**
Students participate in faculty-directed research projects in the toxicology laboratory.

ROTC, Military Officers' Training Program

AIR 1110 Air Force Today 1 **1 QH**
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.

AIR 1111 Leadership Laboratory 1 **1 QH**
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.

AIR 1120 Air Force Today 2 **1 QH**
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.

AIR 1121 Leadership Laboratory 2 **1 QH**
Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.

AIR 1210 Development of Air Power **1 QH**
Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914–1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.

AIR 1211 Leadership Laboratory 3 **1 QH**
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.

AIR 1220 Development of Air Power **1 QH**
Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Students also begin five hours of introductory leadership. Continues emphasis upon student participation and presentations to enhance communicative skills.

AIR 1221 Leadership Laboratory 4 **1 QH**
Continues AIR 1211. Adds a special program in preparation for field training.

AIR 1310 Management and Leadership 1 **4 QH**
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.

AIR 1311 Leadership Laboratory 7 **1 QH**
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.

AIR 1320 Management and Leadership 2 **4 QH**
Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment. Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.

AIR 1321 Leadership Laboratory 8 **1 QH**
Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.

AIR 1410 United States National Security Forces 1 **4 QH**
Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.

AIR 1411 Leadership Laboratory 5 **1 QH**
Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.

AIR 1420 United States National Security Forces 2 **4 QH**
Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communicative skills through student presentation.

AIR 1421 Leadership Laboratory 6 **1 QH**
Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.

ARM 1100 Leadership Laboratory 1 **0 QH**
Introduces first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.

ARM 1101 Introduction to the Army **1.5 QH**
Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style and physical fitness training.

ARM 1102 Basic Leadership **1.5 QH**
Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.

ARM 1103 Basic Tactics **1.5 QH**
Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.

ARM 1200 Leadership Laboratory 2 **0 QH**
Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering, rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship **1 QH**
Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Contemporary Army Operations **1.5 QH**
Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard components. Uses these concepts as building blocks to analyze and discuss United States Army doctrine and tactics. Integrates other world forces into the course structure through the study and examination of ongoing military operations as well as current events inside and outside the military.

ARM 1203 Health and Physical Fitness **1.5 QH**
Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1300 Leadership Laboratory **0 QH**
Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation **2 QH**
Presents advanced land navigation techniques to junior-year ROTC cadets. Introduces the topographic map and its commonly used symbols. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance on a map; and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training **2 QH**
Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic **2 QH**
Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5 **6 QH**
Provides external leadership lab conducted at Fort Lewis, Washington, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 270 colleges and universities from across the nation. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4 **0 QH**
Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills **2 QH**
Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics **2 QH**
Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics **2 QH**
Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory **0 QH**
Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC nursing students.

NAV 1101 Introduction to Naval Science **3 QH**
Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1202 Seapower and Maritime Affairs **3 QH**
Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Russian naval strengths.

NAV 1401 Leadership and Management 1 **3 QH**
Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2 **3 QH**
Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to confidently assume the responsibilities of a commissioned officer in the United States Navy. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.
by all NROTC nursing students.

NAV 1101 Introduction to Naval Science **3 QH**
Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1202 Seapower and Maritime Affairs **3 QH**
Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Russian naval strengths.

NAV 1401 Leadership and Management 1 **3 QH**
Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2 **3 QH**
Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to confidently assume the responsibilities of a commissioned officer in the United States Navy. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.

School of General Studies

ECN 4601 Economics 1 **4 QH**
Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

ED 4003 Integrated Language Skills A **4 QH**
Designed to improve student reading and related study and language skills. Devotes time, discussion, and considerable practice to critical reading and other interpretational acts (inferences, imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4004 Integrated Language Skills B **4 QH**
Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing college term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major, career direction, and self-assessment. *Prereq. ED 4003.*

ED 4005 Integrated Language Skills Seminar **1 QH**
Provides students with necessary information for the transition from freshman to sophomore status. Topics include personal, academic, and career goal setting, workplace market forces, selecting a major, and issues related to achieving sophomore status. Gives students the opportunity to explore a variety of career options both through library research and through interviews. *Prereq. ED 4004.*

ENG 4013 Fundamentals of English 1 **4 QH**
Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.

ENG 4014 Fundamentals of English 2 **4 QH**
Presents intensive instruction in exposition, argument, and academic essay writing and includes instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments. *Prereq. ENG 4013.*

HST 4110 History of Civilization A **4 QH**
Covers the major ideas and institutions of civilization from ancient times to 1648.

HST 4111 History of Civilization B **4 QH**
Continues HST 4110, covering the period since 1648. *Prereq. HST 4110.*

MGT 4110 Survey of Business and Management **4 QH**
Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organizations, and the functions of management in the context of their influence on the various forms of business. Lecture and class discussion give the student an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

MTH 4000 Mathematical Preliminaries 1 **4 QH**
Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.

MTH 4010 Mathematical Preliminaries 2 **4 QH**
Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, factoring, linear equations, graphing, and radicals. For students whose background in algebra is weak.

MTH 4020 Functions and Algebra **4 QH**
Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational. Covers the concept of functions, graphs, line slopes, and graphs of polynomials. Discusses some elementary trigonometry and vectors in the plane.

MTH 4030 Applications of Algebra **4 QH**
Examines linear equations and their graphs, systems of linear equations, and linear inequalities in two variables with application to linear programming. Introduces matrices with application to Markov chains, set theory, techniques of counting permutation, and combinations and elementary probability.

MTH 4040 College Mathematics for Business **4 QH**
Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, compound interest, and annuities.

POL 4106 Introduction to Politics **4 QH**
Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as illustrations of the institutional distinction between a totalitarian and a constitutional system.

SOC 4010 Principles of Sociology 1 **4 QH**
Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

SOC 4011 Principles of Sociology 2 **4 QH**
Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change. *Prereq. SOC 4010.*

English as a Second Language

ESL 1011 Beginning Core-Structure and Communication 0 QH
Integrates instruction in grammar, listening, and speaking for basic-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1012 Low-Intermediate Core-Structure and Communication 0 QH
Integrates instruction in grammar, listening, and speaking for low-intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1013 Intermediate Core-Structure and Communication 0 QH
Integrates instruction in grammar, listening, and speaking for intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1014 High-Intermediate Core-Structure and Communication 0 QH
Integrates instruction in grammar, listening, and speaking for high-intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1015 Advanced Core-Structure and Communication 0 QH
Focuses on listening, speaking, note-taking, and presentation skills with selective grammar review for advanced-level students. Targets skills for academic success in the University. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1021 Beginning Reading 0 QH
Provides guided reading practice to basic-level students. Uses materials designed for students with limited vocabulary and knowledge of English. Focuses on vocabulary development and comprehension of short passages. Encourages active participation and discussion.

ESL 1022 Low-Intermediate Reading 0 QH
Provides reading practice to intermediate-level students. Introduces strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing. Targets vocabulary development. Encourages discussion based on the readings.

ESL 1023 Intermediate Reading 0 QH
Provides reading practice to intermediate-level students. Covers strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing. Targets vocabulary development. Encourages discussion based on the readings.

ESL 1024 High-Intermediate Reading 0 QH
Provides reading practice to high-intermediate-level students. Applies strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing through intensive and extensive reading of a variety of texts: fiction, autobiography, articles of general interest, and selections from university-level textbooks. Continues development of vocabulary. Encourages discussion based on the readings.

ESL 1025 Advanced Reading 0 QH
Provides reading practice to advanced-level students. Applies strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing through intensive and extensive reading of a variety of texts: fiction, autobiography, articles of general interest, and selections from university-level textbooks. Continues development of vocabulary. Encourages discussion based on the readings.

ESL 1031 Beginning Composition 0 QH
Focuses on paragraph development for beginning students with limited grammar and vocabulary. Provides practice with punctuation, spelling, capitalization, and topic and supporting sentences.

ESL 1032 Low-Intermediate Composition 0 QH
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for low-intermediate students. Focuses on writing well-organized and effectively developed paragraphs.

ESL 1033 Intermediate Composition 0 QH
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for intermediate students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1034 High-Intermediate Composition 0 QH
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for high-intermediate students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1035 Advanced Composition 0 QH
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for advanced students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1044 High-Intermediate Listening/Speaking-Pronunciation 0 QH
Focuses on aspects of English pronunciation, including the sounds of vowels and consonants, as well as the patterning of stress and intonation, that aid non-native speakers in speaking intelligibly in English. Develops active listening strategies to improve comprehension. Provides a variety of speaking activities and directed laboratory practice.

ESL 1045 Advanced Listening/Speaking **0 QH**
Explores techniques of effective oral communication and provides opportunities for extensive practice. Develops active listening strategies to improve comprehension and provides opportunities for additional, self-directed study in the listening and video labs.

ESL 1054 High-Intermediate Intensive Grammar **0 QH**
Provides extensive practice and review of major grammatical points with the aim of increasing command of the structures of English and improving writing skills.

ESL 1090 Business Language Skills (Advanced) **0 QH**
Serves as a preparatory course using business cases for non-native-speaking professionals and graduate students entering American MBA programs. Focuses on presentation skills and strategies for participation in bargaining sessions; participants receive practice in writing business case analyses, performance appraisals, reports, and team business plans.

ESL 1091 TOEFL Preparation **0 QH**
A 10-week course. Provides extensive training and practice in test-taking techniques for the TOEFL. Focuses on improving scores with practice tests in grammar, listening, and reading.

Appendix

Campus Map


Boston
Massachusetts
Back Bay / Fens
400 The Fenway
FENWAY
Museum of Fine Arts
FORSYTH WAY
Forsyth Way
HEMENWAY STREET
GAINSBOROUGH STREET
Symphony Road
WESTLAND AVENUE
NORTH PARKING AREA
SPEARE PLACE
ST. STEPHEN STREET
OPERA PLACE
St Annes
Christian Science Church Center
Symphony Hall
Horticultural Hall
HUNTINGTON AVENUE
LeBeau Park
Cabot Court
Krentzman Quadrangle
YMCA
New England Conservatory of Music
ARENA PARKING AREA
ST. BOTOLPH STREET
MASSACHUSETTS AVENUE
MASS. AVE. STATION
PARKER STREET
Tavern Road
FORSYTH STREET
ROBINSON PARKING AREA
LEON PARKING AREA
Leon Street
Peds Street
FIELD STREET PARKING NO. 1
FIELD STREET PARKING NO. 2
CENTENNIAL COMMON
RUGGLES STREET
RYDER PARKING AREA
RUGGLES ST. STATION
MBTA
VISITOR/PAY PARKING
CAMDEN PARKING AREA
Northampton Street
Camden Street
PARKING GARAGE
ENTRANCE
Carter Playground
COLUMBUS PARKING AREA
COLUMBUS AVENUE
EXIT
DAVENPORT PARKING NO.1
DAVENPORT PARKING NO.2
Davenport Street
Douglass Park
Berlin Street
Clonmel Street
Coventry Street
TREMONT STREET
TREMONT PARKING AREA
MELNEA CASS BOULEVARD

Academic and Service Buildings

22 John D. O'Bryant African-American Institute (AF)
12 Barletta Natatorium (BN)
19 Boiler Plant
11 Cabot Physical Education Building (CB) TTY: Rm 110
39 Cahners Hall (CA) TTY: Rm 151
28 Cargill Hall (CG)
13 Churchill Hall (CH)
62 Classroom Building (CL)
59 Columbus Place (716 Columbus Avenue) (CP)
9 Cullinane Hall (CN)
4 John A. and Marcia E. Curry Student Center (Student Lounge) (SC) TTY: Rm 255
40 Cushing Hall (CU)
14 Dana Research Center (DA)
27 Dockser Hall (DK) TTY: Rm 107
Dodge Hall (DG)
61 Maureen and Richard J. Egan Engineering/Science Research Center
3 Ell Student Building (Auditorium) (EL) TTY: Rms 04,104
56 Field Street (FS)
16 Forsyth Building (FR) TTY: Rms 100, 135
17 Forsyth Building Annex (FA)
38 Forsyth Dental Building (FE)
1 Hayden Hall (HA) TTY: Rms 120, 202
33 Hillel-Frager (HF)
24 Holmes Hall (HO) TTY: Rm 276
55 236 Huntington Avenue (HU)
10 Hurtig Hall (HT)
26 Kariotis Hall (KA)
41 Kerr Hall (Faculty Center) (KH)
29 Knowles Center (KN)
25 Lake Hall (LA) TTY: Rm 203
63 Roger M. and Michelle S. Marino Recreation Center
57 Matthews Arena (MA)
58 Matthews Arena Annex (MX)
20 Meserve Hall (ME) TTY: Rm 305
5 Mugar Life Science Building (Peabody Health Professions Center) (MU)
18 Nightingale Hall (NI) TTY: Rm 125
31 Parker Building (PA)
2 Richards Hall (RI) TTY: Rms 150, 254
8 Robinson Hall (RB)
21 Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
15 Snell Engineering Center (SN) TTY: Rm 120
60 Snell Library (SL) TTY: Reference Desk
50 122 St. Stephen Street (SS)
30 Stearns Center (ST) TTY: Rm 302
32 26 Tavern Road (TA)

Residence Buildings

34 Burstein Hall
43 Kennedy Hall
46 142–148 Hemenway Street
45 153 Hemenway Street and Loftman Hall
7 316 Huntington Avenue (Northeastern at the YMCA)
52 319 Huntington Avenue
51 337 Huntington Avenue
36 407 Huntington Avenue
41 Kerr Hall
53 Light Hall
45 Loftman Hall and 153 Hemenway Street
42 Melvin Hall
35 Rubenstein Hall
44 Smith Hall
49 Speare Hall
48 Stetson East TTY (public)
47 Stetson West
50 106/110/116/122 St. Stephen Street
23 Willis Hall
37 White Hall
54 400 The Fenway

Key

Academic, residential, and service buildings

Handicap parking

Accessible routes

Parking areas

Street direction

Underground tunnel

Emergency telephone

TTY locations
See alphabetic list of buildings for **TTY** locations.

TTY: Rm 000

Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 5/96

Academic Calendar 1998–1999

1998

September	4–Sept. 18	Friday–Friday	Divisions B and Z vacation.
	7	Monday	**Labor Day.** University closed.
	17	Thursday	**Fall Commencement.**
	18–22	Friday–Tuesday	Orientation and registration for freshmen and transfer students.
	21	Monday	Upperclass registration (Divisions B and Z) 1 PM.
	23	Wednesday	Classes begin in undergraduate full-time day programs.
October	12	Monday	**Columbus Day.** University closed.
November	11	Wednesday	**Veterans Day.** University closed.
	26	Thursday	**Thanksgiving Day.** University closed.
	26–28	Thursday–Saturday	**Thanksgiving** recess. University closed except key offices.
December	11–17	Friday–Thursday	Fall final examinations for undergraduate full-time day programs.
	18–Jan. 1	Friday–Friday	**Christmas** vacation. University closed except key offices.

1999

January	1	Friday	**New Year's Day.** University closed.
	4–5	Monday–Tuesday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students (Divisions A and Y).
	6	Wednesday	Classes begin in undergraduate full-time day programs for winter quarter.
	18	Monday	**Martin Luther King Jr.'s Birthday** observed. University closed.
February	15	Monday	**Presidents' Day.** University operates on a normal class schedule.
March	15–19	Monday–Friday	Winter final examinations for undergraduate full-time day programs.
	22–26	Monday–Friday	Divisions B and Y vacation.
	29–30	Monday–Tuesday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students (all seniors and Divisions A and Y).
	31	Wednesday	Classes begin in undergraduate full-time day programs for spring quarter.
April	19	Monday	**Patriots' Day.** University operates on a normal class schedule.
May	31	Monday	**Memorial Day.** University closed.

June	7–11	Monday–Friday	Spring final examinations for undergraduate full-time day programs.
	14–18	Monday–Friday	Divisions B and Y vacation.
	19	Saturday	**Commencement.**
	21	Monday	Registration for Divisions A and Z and January freshmen (Quarter 3).
	22	Tuesday	Classes begin in undergraduate full-time day programs for summer quarter.
July	4	Sunday	**Independence Day.** University closed.
	5	Monday	Independence Day observed. University closed.
August	30–Sept. 2	Monday–Thursday	Summer final examinations for undergraduate full-time day programs.
September	3–17	Friday–Friday	Divisions A and Z vacation.
	6	Monday	**Labor Day.** University closed.
	16	Thursday	**Fall Commencement.**
	17–21	Friday–Tuesday	Beginning of 1999–2000 academic year. Orientation, advising, and registration continues for new students and returning Divisions B and Z.
	22	Wednesday	Classes begin in undergraduate full-time day programs for fall quarter.

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

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The *Northeastern University Undergraduate Catalog (Full-Time Day Programs)* contains the University's primary statements about these academic programs and degree requirements, as authorized by the president or the Board of Trustees. For information about other academic policies and procedures; student responsibilities; student academic and cocurricular life; faculty rights and responsibilities; or general personnel policies, benefits, and services, please refer to the *Academic Operations Manual, Undergraduate and Graduate Student Handbook, Cooperative Education Handbook, Faculty Handbook, Benefits and Services Handbook,* and related procedural guides, as appropriate.

Accreditation. Northeastern University is accredited by the New England Association of Schools and Colleges, Inc.

Delivery of Services. Northeastern University assumes no liability for delay or failure to provide educational or other services or facilities due to causes beyond its reasonable control. Causes include, without limitation, power failure, fire, strikes by University employees or others, damage by natural elements, and acts of public authorities. The University will, however, exert reasonable efforts, when it judges them to be appropriate, to provide comparable services, facilities, or performance; but its inability or failure to do so shall not subject the University to liability.

The *Northeastern University Undergraduate Catalog* contains current information about the University calendar, admissions, degree requirements, fees, and regulations; however, such information is not intended and should not be regarded to be contractual.

Northeastern University reserves the sole right to promulgate and change rules and regulations and to make changes of any nature in its program; calendar; admissions policies, procedures, and standards; degree requirements; fees; and academic schedule whenever necessary or desirable, including, without limitation, changes in course content and class schedule, the cancellation of scheduled classes and other academic activities, and the substitution of alternatives for scheduled classes and other academic activities. In any such case, the University will give whatever notice is reasonably practical.

Northeastern University will endeavor to make available to its students a fine education and a stimulating and congenial environment. However, the quality and rate of progress of an individual's academic career and professional advancement upon completion of a degree or program are largely dependent on his or her own abilities, commitment, and effort. In many professions and occupations, there are also requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These requirements may change while a student is enrolled in a program and may vary from state to state or country to country. Although the University stands ready to help its students find out about requirements and changes in them, it is the student's responsibility to initiate the inquiry.

Tuition Default Policy. In cases where the student defaults on his/her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the University, including attorneys' fees.

Emergency Closing of the University. Northeastern University has made arrangements to notify students, faculty, and staff by radio and television when it becomes necessary to cancel classes because of extremely inclement weather. AM stations WBZ (1030) and WRKO (680), and FM stations WBUR (90.9), WBMX (98.5), and WFNX (101.7) are the radio stations authorized to announce the University's decision to close. Television stations WBZ-TV4, WCVB-TV5, and WHDH-TV7 will also report cancellations. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operates when the University is closed. Please listen to the radio or television to determine whether the University will be closed.

If a storm occurs at night, the announcement of University closing is given to the radio stations at approximately 6 AM. Classes are generally canceled for that entire day and evening at all campus locations unless stated otherwise. When a storm begins late in the day, cancellations of evening classes may be announced. This announcement is usually made between 2 and 3 PM.

Equal Opportunity Policy. Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual orientation, age, national origin, disability, or veteran status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to:

Office of Affirmative Action
175 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-373-2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, U.S. Department of Education, J.W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

Family Educational Rights and Privacy Act. In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the *Undergraduate and Graduate Student Handbook* and are distributed annually at registration for the University's colleges and graduate schools.

Persistence Rates under the Student Right-to-Know Act. In the fall of 1997, the persistence rate for students who entered in the Fall 1996 cohort was 78.2 percent.

Mission Statement. Northeastern University is dedicated to providing a diverse student population with an academic program and a course of professional preparation of the highest quality. The University values equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction. As a private, urban university, Northeastern is determined to maintain its reputation as a friend to the city of Boston and a partner of the Commonwealth of Massachusetts.

Northeastern University Publications
02.98.06

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UNDERGRADUATE CATALOG
FULL-TIME DAY PROGRAMS





1999-2000







NORTHEASTERN

Northeastern University

Undergraduate Catalog
Full-Time Day Programs

1999–2000

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The University

Admission

Learning about Northeastern

The Office of Undergraduate Admission encourages prospective students to learn more about Northeastern University. For more information on the following services and events, or to receive additional publications, contact the office at 617.373.2200 (voice), 617.373.3100 (TTY), or 617.373.8780 (fax). Or write: Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115. You may also access our Home Page on the Internet at http://www.neu.edu.

Information sessions. Sessions are scheduled at 10:00 AM and 2:00 PM, Monday through Friday, year-round (except for legal holidays). They include presentations by an admission counselor, an informal question-and-answer period, and a multimedia presentation. Sessions are also held on Saturday mornings from September through June. Special presentations for students interested in engineering are offered each Wednesday at 11 AM at the Admissions Office, 139 Richards Hall, during the fall and winter quarters. Special presentations for students interested in the University Honors Program are offered at 3 PM each Thursday, during February, March, and April, at the Admissions Office, 139 Richards Hall.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admission counselor and to learn more about the University's academic and cooperative education programs. A sign language interpreter can be arranged with advance notification.

Guided tours. Campus tours, led by undergraduate guides, offer students a unique perspective on the Northeastern experience. Visitors observe campus life firsthand and talk with students as they tour academic, residence, and recreation areas. During the fall, winter, and spring, tours are conducted on the hour from 9:00 AM to 3:00 PM, Monday through Friday, and on Saturday mornings at 9:00, 10:00, and 11:00 AM; during the summer, tours are scheduled on the hour from 9:00 AM to 3:00 PM, Monday through Friday. All tours leave from the Admissions Office, 139 Richards Hall.

Open houses. During the fall, late winter, and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admission, cooperative education, student financial services, residential life, student activities, and the University libraries, among other areas.

Admission Policies

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Modified rolling admission. Decisions on admission to all majors except physical therapy (see below) are made using a modified rolling admission plan, with decisions announced from December 1 to May 1 for those applying for the following fall quarter. Applications are considered complete only if they are accompanied by all required credentials (including first marking-period senior grades and Scholastic Assessment Test [SAT] of the College Board or American College Testing [ACT] test scores). In all cases of acceptance, candidates must complete their senior year of high school and submit final transcripts as proof of graduation. Admission is selective, and priority is given to candidates who apply by March 1. Most decisions are rendered before May 1. Candidates for physical therapy are admitted for fall quarter only, and must apply by the preceding February 1 for priority consideration.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before the expected year of their high school graduation. All applicants for early admission must have completed all units required for high school graduation (including senior English) before enrolling at the University, or must have earned the General Equivalency Diploma (GED). Such students may enroll in September, thereby reducing by one year the time to complete degree requirements. Endorsements by the student's school principal, guidance counselor, and parents are required for early admission. The applicant must also provide a 200-word personal statement outlining his or her educational and/or career aspirations.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe in writing the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work. Students granted deferred admission will be required to place a $200 tuition deposit to secure their position.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of $200 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their letter of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students requesting on-campus housing must submit a nonrefundable $400 deposit (in addition to the $200 tuition deposit), along with a completed housing application. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students.

Entrance Requirements

Applicants must have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Assessment Test (SAT) or American College Testing Program (ACT) test results, weighs most heavily in the evaluation process.

Secondary School Preparation

Applicants to *all* University majors are expected to have completed the equivalents of four years of high school English, two years of a single foreign language, three years of mathematics (mandated as algebra 1, algebra 2, and geometry), two years of natural science with labs, and one year of a single unit or combined units in the area of social sciences. Further requirements for specific University majors are outlined below.

Business administration. Candidates must have completed a strong college preparatory program with four years of mathematics, including geometry, algebra 1, algebra 2, and a fourth year of trigonometry and/or analysis.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, (except physical therapy; see below), ***and other sciences.*** Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence should include two years of study and laboratory work in the subject areas of biology, chemistry, and physics. Engineering students must complete high school physics. In mathematics, applicants must have completed a strong college preparatory program with four years of mathematics including geometry, algebra 1, algebra 2, and a fourth year of trigonometry and/or analysis.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, algebra 1, algebra 2, and analysis, and a full year of study and lab work in a natural science.

Physical therapy. Candidates must have completed a full year each of biology and chemistry, with labs. However, due to the competitiveness of the program, it is strongly recommended that applicants also complete a year of physical science and a fourth year of science with lab (such as physics, advanced biology, advanced chemistry, or anatomy and physiology). In math, candidates must have completed geometry, algebra 1, algebra 2, and a fourth year of trigonometry and/or analysis.

Auditions

Music. Applicants for the music literature and performance concentration only are required to provide an audition (either in person or on tape) as part of the admission process to that program. Upon receipt of the complete application for admission, each candidate will receive further information about the audition process.

Entrance Examinations

Freshmen must take the Scholastic Assessment Test (SAT) of the College Board or the American College Testing (ACT). Results of these tests may be sent directly to the Admission Office. The College Board code number for Northeastern University is 3667. When evaluating candidates' SAT scores, the Admission Office will combine the best verbal and math components, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540, or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

It is recommended that candidates for physical therapy take one SAT II subject test in either biology, chemistry, or mathematics.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing the English Language Center program at Northeastern University, or for transfer students by receiving B– or above in non-ESL English Composition courses in English-speaking universities, or by scoring at least 410 on the SAT verbal section.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the paper-based TOEFL or 213 on the computer-based TOEFL must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations in the areas of art (history, studio—general, studio—drawing), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus—Horace), music (theory), and Spanish (language, literature). Advanced placement credit is granted for scores of 4 or better in the areas of biology, chemistry, computer science (A, AB), mathematics (calculus AB, BC), and physics (BC mechanics—C electricity, magnetism).

Health Requirements

The Lane Health Center's Pre-entrance Physical Examination Form is sent to each student following acceptance to Northeastern. Completion of this form is considered a condition of enrollment. Each student must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titer are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. A positive titer for hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply

All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable $45 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate's secondary school counselor or social worker.
- Mail the application form and the check to the Office of Undergraduate Admission, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Assessment Test (SAT) or American College Testing Program (ACT)—to be sent to the University. Transfer students who have completed 36 or more quarter hours of transfer credit are not required to submit test scores.
- For priority consideration, applications should be submitted by March 1; applications for the physical therapy major must be submitted by February 1.
- All materials submitted in conjunction with a student's application become the property of Northeastern University.

International Students

The University welcomes qualified students from other countries. At present, approximately 2,400 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs. The University also welcomes non-matriculated students who wish to improve their English skills by studying at the English Language Center for one or more quarters. The English Language Center also offers counseling and assistance to international students who decide to apply to Northeastern. Admission is contingent upon meeting all University requirements.

In addition to the application process described above, international students must complete the following:

- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed and/or provide an official evaluation by an accredited agency.
- Request the testing agency to submit the official results of the Test of English as a Foreign Language (TOEFL). If these scores are not available at the time of application, it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. A student who attends and successfully completes the course of study offered by Northeastern University English Language Center (ELC) and obtains a "Pass" or a "Release" from the ELC is not required to submit TOEFL scores.
- Request the testing agency to submit the official results of the Scholastic Assessment Test (SAT). Both the SAT math and the TOEFL scores are considered when evaluating an international student's profile. Both the SAT math and verbal scores are considered only when an international student applies for a scholarship or wants to major in a subject that requires a great quantity of writing, such as journalism or communication studies. If these scores are not available at the time of application,

it is the responsibility of the international applicant to take the test at the first available opportunity and have the results submitted as soon as possible. An application is considered incomplete until this credential is received. If the SAT is not offered in the country in which the applicant is studying, the test is not required. A transfer applicant who has successfully completed 36 or more quarter hours is not required to submit SAT scores.

- Submit the Supplementary Form with the application.
- Submit the Declaration and Certification of Finances Form with the application.
- After acceptance, submit the required nonrefundable tuition deposit of $200. Upon receipt of the tuition deposit, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued. Likewise, A-level results of A, B, or C will be awarded credit, as applicable, to the degree being pursued. In addition, the French Baccalaureate diploma with a note of 10 or higher and a coefficient of 3 or higher in many subjects will be awarded credit, as applicable, to the degree being pursued.

Other types of advanced-placement programs offered in a country other than the United States will be evaluated prior to matriculation or by the end of the first quarter of study at the University, and will be awarded credit, as applicable, to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in a regionally accredited college, university, or technical institute or who have earned an associate's degree from a regionally accredited two-year college or other two-year program may seek admission as an upperclass student.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four QH. Students who successfully complete 48 QH generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Transfer credit for coursework completed prior to matriculation to the University will be evaluated only for institutions reported on the student's application for admission. Only official transcripts from these institutions will be accepted for purposes of credit evaluation, with English translation if appropriate. Some students may choose to take additional coursework at another institution after being admitted to Northeastern but before they have matriculated to the University. In this case, the student has up to three quarters of university enrollment to present official transcripts for evaluation of credit; transcripts presented after three quarters will not be evaluated. Similarly, scores from the Colleges Level Examination Program (CLEP) must be presented within three quarters of university enrollment.

Courses taken more than ten years prior to Northeastern enrollment, or reinstatement to the University, will be reviewed for applicability to a degree program by the appropriate curriculum committee.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have or will have completed 36 or more QH of transfer credit. In addition, transfer candidates must

- indicate their choice of college and major on the application; transfers may not request admission to physical therapy
- request that an official copy of their high school transcript and/or General Equivalency Diploma (GED) test scores be sent to the Office of Undergraduate Admission
- request that an official transcript from each college attended be sent to the Office of Undergraduate Admission directly from the registrar's office of the respective colleges
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course)
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement

Transfer candidates should apply by March 1 for priority consideration. Applications will be reviewed on a space-available basis.

Cooperative Education

Richard D. Porter, PhD, *Acting Vice President*
Robert R. Tillman, EdD, *Acting Dean*
Candace A. Herene, BA, *Assistant Dean*
Patricia A. Venter, BS, *Diversity Coordinator*

Associate Professors
Betsey W. Blackmer, PT, EdD
Richard L. Canale, MEd, CAGS
Elizabeth A. Chilvers, MEd
Kathleen L. Finn, EdD, RN
Ann M. Galligan, EdD
Stephen M. Kane, EdD
John A. Saltmarsh, PhD
Melvin W. Simms, EdD

Assistant Professors
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Donald L. Eastridge, MDiv
Veronica L. Porter, MEd
William A. Sloane, MBA

Associate Cooperative Education Coordinators
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Terry H. Chapman, PhD
Jacqueline Diani, MEd
Rosemarie DiMarco, MS
Ellen Duwart, MEd
Jean F. Egan, MEd
Karen P. Kelley, MEd
Barbara E. Lechner, MEd
Kellianne Murphy, MA
Behrooz (Barry) Satvat, PE, ScD
Jacqueline F. Sweeney, MS
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Robert J. Blaser, RPh, MS
Alicia A. Canali, MEd
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Jeffrey A. Doughty, BS
Mark Erickson, MEd
Lisa M. Foster, MS
Pamela W. Goodale, MA
Mary Jane Grusemeyer, MS
Lester P. Lee Jr., MA
Melissa McDaniels, MA
Karen L. Nelson, MArch
Rodney Oudan, MEd
Catherine A. Riley, MA
Anne F. Riordan, MBA
Katherine Sullivan, MSW
Christine P. Tetreault, MA, MEd
Francis M. Williams, MEd
Stephen Williams, JD

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For some programs, cooperative education is a degree requirement. The University assists in providing relevant cooperative education experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and employers.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom study. Co-op students have opportunities to evaluate career decisions early in their college years, while gaining meaningful work experience before graduation and establishing valuable professional contacts and references. Students also earn experiential learning credit by satisfactorily completing the required components of the cooperative education learning process, and the salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science also offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with cooperative education faculty who assist students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as traveling abroad, doing volunteer work, or taking specialized courses at another institution.

International Cooperative Education

The Department of International Cooperative Education offers a variety of services to international students as well as to U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, New Zealand, and Israel for students who have the appropriate background and experience.

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries, especially those located in the Pacific Rim region, to work on co-op for American and national companies.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Summer Orientation

Undergraduate students entering the University in the fall quarter will participate in summer orientation. This required program is a valuable opportunity to prepare for a successful academic career at Northeastern University. During the months of July and August, new students and transfer students will attend a selected orientation session designed to meet their particular needs. Several of the sessions are designated for new students; others are designated for transfer students. Each of Northeastern's schools and colleges is assigned to specific sessions. Participants will attend a session hosted by the school or college to which they have been admitted.

The summer orientation staff includes orientation leaders, students who will serve as valuable sources of information and assistance throughout the program. In addition to the orientation leaders, staff and faculty from various campus offices and your school or college will be available to answer questions and to provide assistance in making arrangements for the fall. During summer orientation, participants will complete placement exams, meet with representatives from their school or college to develop a fall class schedule, register for classes, and obtain a student identification card. Participants will also learn about life at Northeastern, including services and opportunities that will assist with their transition to the University. In addition, participants will be able to contract for meal plans and complete arrangements for campus housing. The schedule also includes opportunities to tour the campus and participate in activities with other students. Student participants will stay in a campus residence hall during summer orientation. Parents/family will participate in a separate but parallel program and will also be invited to stay in a campus residence hall during this session. Registration information will be mailed to incoming students who have paid their tuition deposit. See page 18 for summer orientation fee information.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 AM to 5:10 PM, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement that he/she may have missed because of such absence on any particular day; provided, however,

that such make-up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

Fall, Winter, and Spring Schedule		Sequence 1	MWTh	8:00–9:05
		Sequence 2	MWTh	9:15–10:20
		Sequence 3	MWTh	10:30–11:35
		Sequence 4	MTTh	1:35–2:40
		Sequence 5	MTTh	2:50–3:55
		Sequence 6	MTTh	4:05–5:10
		Sequence 7	TF	8:00–9:05
			W	1:35–2:40
		Sequence 8	TF	9:15–10:20
			W	2:50–3:55
		Sequence 9	TF	10:30–11:35
			W	4:05–5:10
		Sequence 10	TWF	11:45–12:50
	Business Students	Sequence A	MW	8:00–9:40
		Sequence B	W	1:45–3:25
			F	8:00–9:40
		Sequence C	MW	9:55–11:35
		Sequence D	TF	11:45–1:25
		Sequence E	TTh	1:45–3:25
		Sequence F	W	3:30–5:10
			F	9:55–11:35
		Sequence G	TTh	3:30–5:10
		Sequence H	M	3:30–5:10
			F	1:45–3:25
		Sequence I	M	1:45–3:25
			W	11:45–1:25
		Sequence J	TTh	9:55–11:35
		Sequence K	TTh	8:00–9:40
Summer Schedule		Sequence 1	MWTh	8:00–9:05
		Sequence 2	MWTh	9:15–10:20
		Sequence 3	MWTh	10:30–11:35
		Sequence 4	MTh	11:45–12:50
			W	1:00–2:05
		Sequence 5	MTh	1:00–2:05
			W	2:15–3:20
		Sequence 6	MTh	2:15–3:20
			W	3:30–4:35
	Business Students	Sequence A	MW	8:00–9:40
		Sequence B	MW	9:55–11:35
		Sequence C	TTh	8:00–9:40
		Sequence D	TTh	9:55–11:35
		Sequence F	M	1:45–3:25
			W	2:15–3:55
		Sequence G	TTh	11:45–1:25
		Sequence H	TTh	1:45–3:25
		Sequence I	TTh	3:30–5:10

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:25 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of Student Affairs or to the Student Government Association.

Grading System

Grades are officially recorded by letters, evaluated as follows.

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A–	3.667	
B+	3.333	
B	3.000	Good achievement
B–	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C–	1.667	
D+	1.333	
D	1.000	Poor achievement
D–	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
X		Incomplete in a pass/fail course
NE		Not enrolled. Did not attend after the date of record, the start of the second full week.
IP		Course in progress. Intended for courses such as Senior Thesis or a project that extends over several quarters. An IP can be replaced by a regular grade with a standard change-of-grade card. The time restrictions on the I grade do not apply to the IP grade. While unchanged, it is not included in computing the GPA. If never changed, the course does not count toward graduation requirements.

An I, IP, or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, IP, S, and U are not included in the calculation of the quality-point average.

Credit hours. Course credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the dean's office of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.

- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.
- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Quarterly status reports. Grades are mailed to students approximately three days after the end of each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C–. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Procedure for clearing an I or changing other grades. An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and will be billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1986, the University policy has been that any grade outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Students can make up failures by repeating the same course in the full-time day program. Both grades remain on the transcript but only the new grade is used for calculation of quality-point average. With permission from their dean's office, students may substitute an appropriate different course taken in the full-time day program or elsewhere. Credits earned elsewhere, including University College, are treated as transfer credits. Grades below C are not accepted for transfer credit.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board and the student information kiosks. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the Office of the Registrar, 120 Hayden Hall, but only if reported before the start of the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed postcard with the final examinations in order to receive grades early.

Academic Progression Standards

Each college establishes academic progression standards for its own undergraduate students. To progress from one academic year to the next, students must meet the minimum quality-point average(s) (QPAs) and number of earned quarter hours required by their college/program. In addition, many programs require that specific courses be successfully completed to progress to the next year. Students who do not make satisfactory progress will not graduate with their class and may be withdrawn. For more information about academic progression standards for each college, program, or major, please refer to curriculum guidelines, which can be found either in individual college guidebooks or in the college sections of this *Undergraduate Catalog*, starting on page 26.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor and selection as the class marshal (June only) are reserved for students who have been registered at Northeastern University for at least seventy-two quarter hours.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (*cum laude*)
3.50–3.74	Graduation with high honor (*magna cum laude*)
3.75–4.00	Graduation with highest honor (*summa cum laude*)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Freshmen and upperclass students should consult the office of the dean of the college to which they want to transfer. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space. Deadlines are at the discretion of the colleges.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of sixteen quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middlers, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload policies. Inasmuch as withdrawal from a course can be accomplished up to the eighth week, no rebate or credit is granted when a student voluntarily drops a course. An exception can be made if the withdrawal takes place during the first week, but a student should raise the issue at that time.

Students who enroll in overload courses will be billed at the overload rate, 1/16 of the tuition for that quarter, per quarter hour.

Any upperclass student taking a full course load may elect to take an additional enrichment course without charge. No credit is given for this course. The procedure for taking this course is as follows: Confer with your dean or his or her designee to establish eligibility under the conditions that this course will be a four-quarter-hour basic college course; be the only such tuition-free course permitted during the upperclass academic year; be in addition to the normal course load for the quarter; be on a space-available basis on registration day, with priority given to tuition-paying students; not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours.

Should you later petition to have credits earned in this course apply to your degree, you must: (a) obtain the approval of your dean or his or her designee; (b) pay tuition at the rate current at the time of petition; and (c) complete the process by May 1 of your senior year. After you and the dean or his or her designee have filled out and signed the necessary form, take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Division conflicts. Students who are in the wrong division for a given quarter will be purged from all preregistered courses for that quarter unless their division assignment is correct one month prior to the start of that quarter. Students must contact their college dean's office and/or Cooperative Education to correct their status.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean or the department that offers the course. After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Registrar, Bursar, or Financial Aid promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the transcript office at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone and fax requests are not accepted, and no transcripts can be faxed from the University. Currently enrolled students can obtain unofficial transcripts in person from the student information kiosks located around campus. Students not currently enrolled can obtain an unofficial transcript in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Students should contact the office of the dean of their college. Students wishing to transfer should consult the dean's office for their school.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from coursework (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

Northeastern University is eager to assist you in developing a plan for financing a Northeastern education. Through a variety of options—financial aid, supplemental loans, Northeastern's Monthly Payment Plan, and your own resources—a plan can be designed that will make your education costs affordable.

Financial Aid
For many families, financial aid is a major element in making Northeastern University affordable. The Office of Student Financial Services provides a full range of options that help undergraduate and graduate students finance their educations. To take advantage of Northeastern's financial aid programs, freshmen must submit the FAFSA and PROFILE forms and upperclass students must submit the FAFSA and NU Upperclass Application. For more information, please contact our Office of Student Financial Services at 617.373.3190.

Student/Parent Loans
In addition to the federal loans that may be on your Offer of Financial Assistance, there are additional loans that can assist you in financing your Northeastern education. Federal PLUS loans for parents/guardians are available at competitive interest rates; you may borrow up to the cost of your education less any financial aid or loans you are receiving. The MASSPlan, a family loan program, is available to all Northeastern families (regardless of state of residence) once eligibility requirements are met. For information about these and additional borrowing options, please contact our Loan Office at 617.373.3386.

Northeastern's Monthly Payment Plan
All full-time students have the option to enroll in the University's Monthly Payment Plan. This plan allows students and families to spread their annual tuition costs (less the financial aid) over twelve months. (See enrollment dates below.) The plan is administered by Academic Management Services (AMS). For additional information you may contact the Bursar's Office at 617.373.2270 or AMS at 1.800.635.0120 or visit the Web sites http://www.neu.edu/bursar/ or http://www.amsweb.com.

Enroll by	Monthly payments
June 25	Budget amount/12 payments
July 25	Budget amount/11 payments
August 25	Budget amount/10 payments
September 25	Budget amount/9 payments

Payment Methods and Due Dates

The following are accepted methods of payment.

- Check or Money Order made payable to Northeastern University.
- Mastercard, Visa, American Express, or Discover. Payments may be made by calling our 24-hour automated charge line, 617.373.2319 or, outside the 617 area code, 1.800.937.4067.
- Enrollment in Northeastern's Monthly Payment Plan.

Full payment of tuition, residence hall fees, and other related charges are due prior to the start of each academic quarter. The payment due dates are as follows.

Fall Quarter	
Freshmen	August 1
Upperclass	August 19
Winter Quarter	
Freshmen and Upperclass	November 25
Spring Quarter	
Freshmen and Upperclass	February 26
Summer Quarter	
Freshmen and Upperclass	May 19

Students are responsible for the prompt payment of all bills. If you have not received a bill by the first week of the quarter, please contact the Bursar's Office and a bill will be generated for you.

Any discrepancies on your bill should be brought to the attention of the Bursar's Office in writing

within thirty days. If there is a billing problem, pay the undisputed portion of the bill to avoid any additional late fees.

Overloads/Reduced loads. Undergraduate day tuition is charged on a flat per-quarter basis that includes the cost of each student's normal academic curriculum requirements for that quarter. An overload occurs when a student is enrolled in more courses than prescribed by the program's curriculum. Undergraduate full-time day students may register for an additional one quarter hour course without added charge, as long as they are registered for a full course load. Adjustments are made for undergraduate full-time students with reduced loads only when the course load falls below twelve credits.

Delinquent balances. In cases of student default on tuition payments, the student is liable for the outstanding tuition as well as for all reasonable collection costs and any legal fees incurred by the University during the collection process. Accounts may be subject to monthly interest charges. ***Transcripts and other academic records will not be released until all financial obligations to the University have been met.***

Tuition, Room, Board, and Fees Per Quarter 1999–2000 Academic Year

At Northeastern University, the academic year consists of four quarters. Full-time freshmen spend three quarters in classes and a summer term on co-op or on vacation. Full-time upperclass students participating in the co-op program typically spend two quarters in classes and two quarters on co-op. As a transfer student, the number of quarters you will spend in school depends upon the curriculum of your college. A transfer student may be in school for three quarters and on co-op for one. You are advised to verify your curriculum with your dean's office so that you can plan accordingly.

Freshmen enrolled with partial credit will be charged the upperclass tuition rate when they reach sophomore status or have 36 earned quarter hours, including transfer credits.

Freshmen enrolled with partial credit will be charged the upperclass rate the quarter they reach sophomore status.

The total costs for students living in our residence halls and enrolled in the 19-meal plan are as follows:

Tuition and fees per quarter	Freshman	Upperclass
Tuition	$6,225.00	$7,780.00
Student center fee	50.00	50.00
Student activities fee	14.00	14.00
Health service fee	660.00*	660.00*
Room, board, and fees per quarter		
Residence activity fee	$15.00	$15.00
Housing, White Hall	1,560.00†	1,560.00†
Nineteen-meal plan	1,375.00	1,375.00
Total cost per quarter	9,899.00	11,454.00
Total annual cost	$29,697.00	$22,908.00

Assumption: (Freshmen: three quarters in school; upperclass: two quarters in school)

*Annual Fee: Students may waive health service fee. See University health insurance.

†Rates vary depending on occupancy and assignment. See Room and Board.

The total costs for commuting students are as follows:

Tuition and fees per quarter	Freshman	Upperclass
Tuition	$6,225.00	$7,780.00
Student center fee	50.00	50.00
Student activities fee	14.00	14.00
Health service fee	660.00*	660.00*
Total cost per quarter	6,949.00	8,504.00
Total annual cost	$20,847.00	$17,008.00

Assumption: (Freshmen: three quarters in school; upperclass: two quarters in school)

*Annual Fee: Students may waive health service fee. See University health insurance.

In addition to the expenses itemized above, families should plan on the normal costs of living that students incur for transportation, books, and personal expenses. These vary widely depending upon such things as lifestyle and distance from home, but for the purpose of approximating a student budget, the University estimates these items at $2,550/year for residents and $4,440/year for commuting students.

Tuition rates, room and board charges, and fees are subject to revision by the board of trustees at any time.

The following fees are required of all students.

Application fee. This nonrefundable $45 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of $200, which is applicable toward the first quarter's tuition, is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their letter of acceptance.

Summer orientation fees. Summer orientation registration materials will be mailed to incoming students who have paid their tuition deposit. The summer orientation is a mandatory program for all new and transfer students enrolled in classes for the fall quarter. A nonrefundable fee must accompany the student registration for summer orientation. This fee covers all program materials, meals, and housing. The fee is $150 for new students and $95 for transfers. Session changes once assigned will increase the fee by $10 to cover related administrative costs. Students should contact the Office of New Student Orientation and Commuter Services if they wish to make payment arrangements for their summer orientation fee. Each parent or family member who will attend the parents/family summer orientation program must also include the nonrefundable fee of $115 with his or her registration.

Student services fee. Students pay a $50 quarterly student center fee to support the Curry Student Center and a $14 quarterly student activities fee to support student clubs.

Husky Card (photo-identification card). This card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs $5.

University health insurance. The University provides hospital insurance for all students who have matriculated, are carrying a course load of nine credits or more, or who are in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Finance Office, 249 Richards Hall. Deadlines for waiving are applicable. A waiver form must be completed annually at the start of each academic year.

Health Service Waiver Process. All students who have matriculated, are taking at least nine quarter hours, or who are enrolled as full-time students are eligible for membership in the University-sponsored health insurance plan. First-year students are eligible to waive the Health Service insurance fee if they can show proof of comparable coverage. Deadline dates do apply. Contact the Finance Office at 617.373.2111 for specifics.

Sports pass fee. This $45 fee ($25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following:

Housing pre-payment. New students seeking on-campus housing must submit a nonrefundable $400 prepayment along with a completed housing application form to complete the housing application process. The upperclass housing prepayment is $200 for one quarter or $150 per quarter for two or more quarters.

Residence hall activities fee. All students living in the residence hall system pay a quarterly $15 fee for activities sponsored by the Residence Student Association.

Late fees. All accounts not paid in full by the indicated due dates will be subject to a late fee of $200.

International student fee. A one-time fee of $200 is charged to new undergraduate international students, payable after their acceptance at Northeastern University. The fee supports services available at the International Student Office.

Laboratory fees. Students taking laboratory courses will be charged for laboratory cards. The laboratory card fee will be applied to the tuition bill. Rates for the laboratory cards are as follows:

Arts Studio Laboratory	$35	Geology Laboratory	$50
Biology Laboratory	$50	Media Studio Laboratory	$35
Chemistry Laboratory	$65	Medical Laboratory/Science Laboratory	$35
Computer Graphics Laboratory	$50	Photography Laboratory	$50
EMT/Paramedic Laboratory	$25		
Film Courses Laboratory	$30		

Liability insurance. Liability insurance must be carried by students as required by the academic program. This fee of $18 is charged once per year.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen-meals-per-week option ($1,375). Once on campus, freshmen may select either a ten- or fifteen-meal-plan option.

Returning upperclass students must apply for housing each quarter.

Standard Residences (per quarter)

Residence Halls	Single	Double	Triple
Kerr Hall	$1,775	$1,560	
Light Hall	$1,775	$1,560	$1,430
Melvin Hall	$1,775	$1,560	$1,430
Smith Hall	$1,775	$1,560	$1,430
Speare Hall	$1,775	$1,560	
Stetson East/West	$1,775	$1,560	$1,430
White Hall	$1,775	$1,560	$1,430

Suites	Single	Double	Triple
Kennedy Hall	$1,775	$1,560	$1,115
153 Hemenway	$1,775	$1,560	$1,430

Apartments	5 Bed/dbl	6 Bed/dbl	8 Bed/dbl
Loftman Hall	$1,745	$1,765	$1615

Apartments	Single	Double	Triple	Quad
Burstein Hall		$1,700	$1,440	$1,430
Rubenstein Hall		$1,700	$1,160	$1,430
319 Huntington	$2,180	$1,395	$1,225	$1,140
337 Huntington		$1,395	$1,225	$1,140
St. Stephens St. Apartments		$1,395	$1,225	$1,455
Willis Hall	$2,315	$2,165		$1,855

The rates listed above are for standard room accommodations only. Rates can vary based upon adjusted capacities and room size or occupancy.

Freshman residence termination fee. Students who sign the license agreement are required to live on campus for the terms of the agreement. Students who fail to honor their agreement will be subject to a termination fee of 50 percent of subsequent quarter's room charge.

Other residence rate adjustments. Students who terminate their license agreements before the third quarter, either voluntarily or involuntarily, will be assessed charges as outlined in the Residence Hall and Dining License Agreement.

Residence rate adjustments may be made provided specific conditions are met and a housing withdrawal form has been filed with Residence Life Office. Details regarding these conditions may be found in the Residence Hall and Dining License Agreement.

Freshmen and transfer students should refer to the Residence Hall and Dining License Agreement for specific rate adjustment information.

The standard adjustment rates for upperclass and upperclass graduate students are:

During the first week	75 percent credit
During the second week	50 percent credit
During the third week	25 percent credit
After the third week	no credit

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter	
19	$1,375	
15	$1,245	
10	$1,125	
5	$ 555	upperclass only

Husky account. Students deposit funds into a Husky Account and, using their Husky Cards, can purchase books, groceries, tickets, and snacks at convenient locations on and off campus. The account accrues no interest. Contact the Husky Card office at 617.373.8322 for additional information or visit our Web site at http://www.neu.edu/bursar/huskyid/.

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievement. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office, the registrar's course listings, and on the website www.casdn.neu.edu/honors/.

There is another type of honors course, a course to which an adjunct course is attached. These adjuncts, numbered 1777 or 1778, run along with a normal course and make the normal course into an honors course. Adjunct courses carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Because the availability of adjunct courses does not appear in the registrar's course listings, students must consult the honors program office or the website for an up-to-date list. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurriular cultural and recreational activities. Students may choose special honors housing in 115–119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

For academic credentials to be considered for the following scholarships, a completed admissions application should be submitted no later than January 1 preceding fall enrollment.

Merit Scholarships

Ambassador Award. The University offers a limited number of scholarships for exceptional academic achievement to non-U.S. citizens. The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are renewable to students with a cumulative grade point average of 3.0.

Boston Youth Leadership Award. *Award:* $6,500 grant for campus room and board. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.0. *Eligibility:* Applicants for fall freshman admission to Northeastern University who have demonstrated outstanding community leadership and service and who will graduate in the top quarter of their class at a Boston public, private, or parochial school. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Carl S. Ell Scholarship. *Award:* Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade-point average of 3.25. *Eligibility:* Applicants for fall freshman admission to Northeastern University who have earned a 3.75 grade point average (on a 4.0 scale) with a combined math and verbal score of 1300 or higher on the Scholastic Assessment Test (SAT). Awardees must maintain enrollment in the Honors Program and follow procedures to receive state and/or federal education grants to which they may be entitled.

Presidential Scholarship. *Award:* Full tuition scholarship. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.5 and complete their cooperative education work placements. *Eligibility:* Awards are given to students entering their middler year who have demonstrated excellence in their major, in their liberal arts courses, and in their cooperative education work placement. Applicants must have a minimum grade point average of 3.5, lived in campus residents a minimum of four quarters (including academic and coop quarters), completed the first three quarters of the sophomore year, and participated in at least one coop placement.

Ralph J. Bunche Scholarship. *Award:* Full tuition, room, and board (based on double occupancy). Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to

Northeastern University who are African American and who will graduate from high school with a 3.5 grade point average with a combined math and verbal score of 1200 or higher on the SAT. Awardees must reside on campus and follow procedures to receive state and/or federal education grants to which they may be entitled.

Reggie Lewis Memorial Scholarship. *Award:* Full tuition scholarship. Awards are renewable for recipients who maintain normal progress toward their degree with a minimum grade point average of 3.00. *Eligibility:* Applicants for fall freshman admission to Northeastern University who are members of a federally designated ethnic minority group and will graduate from high school with a 3.5 grade point average and receive a combined math and verbal score of 1150 or higher on the SAT. Awardees must follow procedures to receive state and/or federal education grants to which they may be entitled.

ompensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, College Writing 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000	Mathematical Preliminaries 1
ENG 1110	College Writing 1†
or	
ENG 1013	Basic Writing

Winter*

MTH 1010	Mathematical Preliminaries 2
ENG 1111	College Writing 2

Please note that successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for:

MTH 1101, MTH 1106, MTH 1107, and MTH 1108	Nonbusiness mathematics sequence; and
MTH 1113 and MTH 1114	Business mathematics sequence

A passing letter grade in College Writing 1 is a prerequisite for:

ENG 1111	College Writing 2

*The same sequence is offered winter/spring for students who enter in January.
†Students whose work in this course is unacceptable for success in ENG 1111, College Writing 2, will receive a grade of U and must repeat ENG 1110.

chedule for Continuation of ompensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no designates non-acceptance, and an n/a, not applicable.

	College Writing 1 Basic Writing (ENG 1110/1013)	**Basic Writing College Writing 2** (ENG 1110/1111)	**Mathematical Preliminaries 1*** (MTH 1000)	**Mathematical Preliminaries 2*** (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science[1]	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes[2]	yes[2]
Engineering[1]	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes[3]	yes	no	no

[1]This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.
[2]Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.
[3]This college will accept ENG 1110 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Training Program

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617.373.2372.

Army

Richard D. Bourgault, Lt. Col., U.S. Army, MBA, *Professor and Chair, Department of Military Science*

Assistant Professors

Mark C. Boussy, Capt., BS
Malcolm S. Burr, Maj., BA
Paul J. Cancelliere, Maj., MBA
John P. Drohan, Capt., BA
Brian M. Hamilton, Maj., MA
Valerie D. Iyawe, Maj., BS
Sara L. Johnson, Capt., BS
Kelly J. LaCross, Maj., MBA
Sterling D. Macleod, Maj., BA
Bruce K. Obear, 1Lt., *BA*

Instructor

Bobby R. Captain, SFC, AA

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middler, junior, and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent) or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a $150-per-month stipend while in school. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for $16,000-per-year scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. Scholarship students also receive allowances for textbooks and a $150-per-month stipend while in school.

Transfer students, whether or not previously enrolled in ROTC, are welcome to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

Air Force

Kenneth W. Williams, U.S. Air Force, MA, *Professor and Chair*
Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1501, or call 617.353.4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur a ten-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character, and successfully complete a six-week field training encampment during the summer before the start of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to college freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships. The scholarships include full or partial tuition, a $150 per month stipend, and a book allowance.

Navy Nursing Program

Randall D. Preston, Capt., U.S. Navy, BS, *Professor and Chair, Department of Naval Science, Boston University*

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Nursing students wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617.353.2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a $150 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a $150 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years; college-program students serve for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each major description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

College of Arts and Sciences, Dean's Office		100 Meserve
Academic Program Offices	African-American Studies	132 Nightingale
	American Sign Language–English Interpreting	405 Meserve
	Anthropology	501 Holmes
	Art and Architecture	239 Ryder
	Behavioral Neuroscience	125 Nightingale
	Biochemistry	414 Mugar
	Biology	414 Mugar
	Chemistry	102 Hurtig
	Communication Studies	101 Lake
	Economics	301 Lake
	Education	54 Lake
	English	406 Holmes
	Geology/Environmental Geology	14 Holmes
	History	249 Meserve
	Human Services	33 Lake
	International Affairs	303 Meserve
	Journalism	102 Lake
	Linguistics	563 Holmes
	Mathematics	567 Lake
	Modern Languages	400 Meserve
	Music	351 Ryder
	Philosophy and Religion	371 Holmes
	Physics/Applied Physics	111 Dana
	Political Science	303 Meserve
	Psychology	125 Nightingale
	Sociology	500 Holmes
	Theatre	337 Ryder
Bouvé College of Health Sciences		134 Mugar
College of Business Administration		250 Dodge
College of Computer Science		161 Cullinane
College of Criminal Justice		204 Churchill
College of Engineering		220 Snell
School of Engineering Technology		120 Snell
School of General Studies		249 Ryder

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Office of the Registrar, 120 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours of academic credit, including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university or University College may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617.373.2512.

Writing for the Professions	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop (Mechanical Engineering Technology or petition only)	ENG 1340
Writing for the Health Professions	ENG 1380
Advanced Writing	ENG 1352
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Health Sciences	ENG 1380
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125
College of Engineering (Mechanical)	ENG 1340

Diversity Requirement

Northeastern University requires that all students complete a diversity requirement before graduation. The requirement may be fulfilled by completing a pre-approved course or by participation in an activity such as international co-op, study abroad, or diversity training. Each college has developed its own program to satisfy this requirement, so please consult your college for more details.

The Academic Common Experience

In June 1995, Northeastern University adopted the Academic Common Experience (ACE), a new model for all undergraduate programs. In ACE, the faculty identified a set of shared general education goals for all students in all majors. The ACE shared goals are:

Skills: Effective thinking, effective communication, information literacy, and interpersonal skills.
Contexts: The natural world, and the social/cultural world.
Perspectives: The historical, the ethical, the aesthetic, and the personal.
Connections: Across disciplines, between the theoretical and the applied, between the academy and the world of work, and between college study and lifelong learning.

Course content and course assignments throughout the program of study should reflect these shared goals. As students progress through their individual academic and cooperative education programs, there is progressive and cumulative learning that reinforces and broadens understanding and appreciation of these goals both personally and professionally.

The Northeastern faculty, administrators, and students who worked together to create ACE realize that the best education instills a spirit of inquiry, a love of learning, and a habit of reflective thought. It prepares students for the future by enabling them to build on the knowledge they have already acquired. It also helps develop skills and understanding that can be transferred from one academic discipline to another and from the classroom to life experience.

Many schools use required courses to fulfill these educational goals, yet often it is not clear to students why they have to study certain subjects or how the subjects relate to the major. With ACE, however, faculty teaching in the major are responsible for general education as well. They pay attention to how the major and other courses fit together, reinforcing what is learned from course to course and from year to year, both inside and outside the classroom. ACE focuses on the objectives of courses as a whole and on the abilities and awareness students should possess when they graduate, regardless of major.

Undergraduate Degrees

College of Arts and Sciences

Bachelor of Arts
Bachelor of Science

Majors
Concentrations
Minors

African-American Studies
Cultural Studies
Historical Studies
Social/Behavioral Studies
African-American Studies

American Sign Language–English Interpreting[1]

Anthropology
Anthropology

Applied Physics[1]

Art
Animation
Architecture
Photography
Art

Behavioral Neuroscience
Neuroscience

Biochemistry[1]

Biology
Marine Biology

Biomedical Physics

Chemistry
Chemistry

Communication Studies
Speech and Rhetoric
Organizational Communication
Radio and Television
Communication Studies

Economics
Economics

Education (Programs)
Early Childhood Education
Elementary Education
Secondary Education

English
Creative Writing
Literature

Environmental Geology
Environmental Geology

Environmental Studies

Geology
Geology

History
History

Human Services
Human Services

Independent Studies

International Affairs
International Affairs

Journalism
Advertising
Newspaper/Print Media
Public Relations
Radio/Television News

Linguistics
Linguistics

Mathematics
Mathematics

Media Arts and Design

Modern Languages
French
Russian
Spanish
French
Russian
Spanish

Music
Music Industry[1]
Music Literature[2]
Music Literature and Performance[2]
Music Technology
Music
Music Industry

Philosophy
Philosophy
Religious Studies

Physics
Physics

Political Science
International Relations and Comparative Politics
Law and Legal Issues
Public Administration
Political Science

Psychology
Psychology

Sociology
Sociology

Theatre
Theatre Generalist
Production
Performance
Theatre

Integrated Dual Majors Program

Multimedia Studies
Animation
Graphic Design
Photography
Music Technology

Interdisciplinary Minors
Asian Studies
Cinema Studies
International Affairs
Jewish Studies
Latino, Latin American, and Caribbean Studies
Linguistics
Marine Studies
Media Studies
Technical Communication
Urban Studies
Women's Studies

[1]Bachelor of Science only
[2]Bachelor of Arts only

Bouvé College of Health Sciences

Associate in Science
Bachelor of Science
Doctor of Pharmacy (6-year program)

Majors
Concentrations
Minors

- **Athletic Training**
- **Cardiopulmonary Sciences**
  - Cardiovascular Technology
  - Exercise Physiology
  - Respiratory Therapy
- **Medical Laboratory Science**
  - *Medical Laboratory Science*
- **Rehabilitative Science**
- **Speech-Language Pathology and Audiology**

Additional Degrees

- **Associate in Science in Dental Hygiene**
- **Bachelor of Science in Dental Hygiene**
- **Bachelor of Science in Nursing**
- **Bachelor of Science in Pharmacy**
- **Bachelor of Science in Physical Therapy**
- **Bachelor of Science in Toxicology**

College of Business Administration

Bachelor of Science in International Business
Bachelor of Science in Business Administration

Concentrations

- Accounting
- Entrepreneurship and Small Business Management
- Finance and Insurance
- Human Resources Management
- International Business Administration
- Logistics and Transportation
- Management
- Management Information Systems
- Marketing

Minor

- *Business Administration*

College of Computer Science

Bachelor of Science
Bachelor of Science in Information Science
Bachelor of Arts

Minor

- *Computer Science*

Dual Majors

- **Computer Science and Cognitive Psychology**
- **Computer Science and Mathematics**

College of Criminal Justice

Bachelor of Science

Concentrations

- Criminology and Corrections
- Legal Studies
- Policing and Security

College of Engineering

Bachelor of Science

Bachelor of Science in Chemical Engineering

Bachelor of Science in Civil Engineering

Bachelor of Science in Computer Engineering

Bachelor of Science in Electrical Engineering

Concentrations

- Electrical Engineering
- Computer Engineering
- Power Systems

Additional Degrees

Bachelor of Science in Industrial Engineering

Bachelor of Science in Mechanical Engineering

Bachelor of Science/Master of Science in Electrical Engineering

Bachelor of Science/Master of Science in Industrial Engineering

Bachelor of Science/Master of Science in Mechanical Engineering

School of Engineering Technology

Bachelor of Science in Engineering Technology

Majors

- **Aerospace Maintenance Engineering Technology**
- **Computer Technology**
- **Electrical Engineering Technology**
- **Mechanical Engineering Technology**

Minors

- *Computer Technology*
- *Electrical Engineering Technology*
- *Mechanical Engineering Technology*

College of Arts and Sciences

James R. Stellar, PhD, *Dean*
Timothy Donovan, PhD, *Associate Dean, External Affairs*
Kay D. Onan, PhD, *Associate Dean, Faculty Affairs, and Director of the Graduate School*
Malcolm D. Hill, PhD, *Associate Dean, Undergraduate Affairs*
Joyce Interrante, MA, *Coordinator, Academic Student Services*
Mary Mello, MA, *Director, Academic Student Services*
Gail F. Leclerc, MEd, *Academic Adviser*
Beth Rascoe, MA, *Coordinator, International Study Programs*
Gail Stubbs, MEd, *Associate Director, Academic Student Services*
Jan Swindlehurst, MFA, *Coordinator, Academic Student Services*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices. The college also emphasizes experiential education through cooperative education, service-learning, and other kinds of internships, student-faculty research collaborations, and study abroad.

In most programs, students may choose four- or five-year experiential education plan. The five-year plan offers co-op opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language or American Sign Language. The Bachelor of Science degree requires fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major, and the college offers a number of specific integrated dual major programs. Students who pursue either a double major or an integrated dual major are allowed unlimited double counting between their major and core curriculum courses. Students whose double major involves a BA and BS degree or two BA degrees may do the BS version of the core curriculum but must still complete the foreign language requirement.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. Some majors have additional specific requirements in order to progress from year to year. For further details, refer to the *College of Arts and Sciences Guidebook* available in the Center for Experiential Education and Academic Advising in One Meserve Hall.

Transferring to Arts and Sciences Majors

The criteria and process for transferring into each Arts and Sciences major may be found in the *College of Arts and Sciences Guidebook*. Although students may meet the criteria, however, acceptance into certain majors is also based on space availability.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts (BA) or Bachelor of Science (BS) degree must successfully complete a minimum of 176 quarter hours. In addition, a combination of no more than 4 quarter hours of (1 or 2 credit) physical education activity courses or ROTC credits may be used to meet this requirement.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in progress at the time of application, the student must submit an updated official transcript for review once grades for the courses have been posted. Students should contact a major or dean's office adviser prior to enrollment or during their first quarter to have transfer credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the Meserve Hall.

Core curriculum. All students in the College of Arts and Sciences must complete the college's core curriculum in order to graduate. The college believes that there are important areas of inquiry with which all students should have experience. The core curriculum is a set of course requirements intended to provide the breadth of experience essential to a well-rounded individual and the broad base of knowledge traditionally associated with a liberal arts education.

All students receive instruction in fundamental English and mathematics. In addition, students pursuing the Bachelor of Arts degree study a foreign language. The core curriculum is meant to complement students' major programs by providing opportunities to explore a range of disciplines in the arts and humanities, social sciences, and mathematics and sciences, as well as to learn the issues, perspectives, and analytical tools used in these domains. The core also familiarizes students with areas and approaches to learning not available strictly through their own major.

Students explore Western cultural history as it has shaped our society and the traditions of non-Western cultures that are becoming increasingly important in an interconnected world. The core curriculum introduces historically important world views, theories, and changes in intellectual history, as well as current issues and problems facing contemporary society.

The core curriculum has the additional function of providing students with crucial skills useful in all areas of study and in future life endeavors. Every course within the core emphasizes writing proficiency, analytical thought, and methods of inquiry. Writing is the key to communication and is necessary for clear thinking and the expression of one's ideas; methods of inquiry comprise ways of learning; and analytical thought comprises logical thinking, which is the construction of valid arguments. Instruction in core courses strives to emphasize all these skills, which form the basis of a well-educated and intellectually skilled student who can apply his or her talents in whatever field of endeavor s/he chooses to undertake.

The core curriculum consists of six categories:

Category I Basic Skills
- Freshman English (two or three courses depending on placement level upon entry to the University)
- College mathematics (one to three courses depending on placement level upon entry to the University)
- Modern language or American Sign Language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry
Category III The Western Cultural Heritage
Category IV Alternative Cultures and Societies
Category V Theoretical Perspectives and Changes
Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the appropriate department or the Center for Experiential Education and Academic Advising, One Meserve Hall.

Descriptions for all College of Arts and Sciences courses begin on page 132. Courses approved for the college's core curriculum are noted in parentheses at the end of the appropriate course descriptions. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Center for Experiential Education and Academic Advising in One Meserve Hall, provides a list of courses that may be used to fulfill each category requirement and more specific details on the core curriculum.

Experiential Education Requirement. All Arts and Sciences students who will graduate in or beyond the year 2000 are required to fulfill a college experiential education requirement. This requirement is made up of two components: 1) an approved learn-by-doing experience (e.g., co-op, internships, fieldwork or practica, study-abroad programs, service-learning projects, and others), and 2) an academic course that is designed to allow the student to reflect upon the experiential component. Students are considered to have fulfilled the college's experiential education requirement only when

both components have been satisfactorily completed. Although the experiential requirement does not necessarily have to be fulfilled in the student's major, each department does have specific ways for its students to fulfill the requirement.

The experiential education requirement should generally be completed during the middler, junior, or senior year. Academic courses that fulfill the course component of the experiential education requirement are listed and described in the *College of Arts and Sciences Guidebook*, which is available in the Center for Experiential Education and Academic Advising in One Meserve Hall. This guide gives more specific information about the requirement and informs students about how to plan for it. Academic departments and program offices also have information specific to the requirement for the majors that they offer, and every major has an experiential education adviser available to students who have questions about the requirement or who need advice on how to fulfill it. These advisers are also listed in the guidebook.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language or American Sign Language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian, or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be fulfilled in the full-time day programs at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program should complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332, Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a video production requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

Required courses. INT 1320, Exploring the Humanities through Film, or LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1180, Video Basics; or CMN 1450, Television Studio Production. ***Choose five electives:*** AFR 1133, History of Blacks in the Media and the Press; ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; CMN 1451, Foundations of Broadcast Technology; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); CMN 1620, Television Criticism; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNC 1553, Chinese Film: Gender, Ethnicity, and Urbanity; LNF 1521, French Film and Culture; LNF 1560, Film and Psychoanalysis; LNG 1554, Modern German Film and Literature; LNR 1550, History of Soviet Cinema; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (21 Dockser), at 617.373.5163.

Minor in International Affairs

The minor in International Affairs provides students with the opportunity to develop a greater awareness and understanding of both regional and global issues. It seeks to better prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate.

Students must have a minimum grade point average of at least 2.75 to declare an International Affairs minor and must maintain a minimum 2.75 grade point average until the completion of their International Experience.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of *Regional Analysis* and *Global Dynamics and Development* and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study-abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international co-op, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of 8 credits is required.

Elective categories. A total of five elective courses is required from the dual categories of *Regional Analysis* and *Global Dynamics and Development*, as listed below. Students must take at least two courses from each category. All electives must be taken from outside the student's major.

Regional Analysis. Students must select two or three courses from this category, and these courses must be chosen from at least two different regional subcategories.

Africa: AFR 1197, Modern African Civilization; AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization; AFR 1342/POL 1342, Crisis and Conflict in Black Africa; AFR 1403/HST 1623, History of West Africa; and AFR 1405/ HST 1625, South African History.

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History; HST 1633, Modern China; HST 1634, Contemporary China; HST 1637, Modern Japan; MUS 1183, Music of East Asia; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions; PHL 1293, Eastern and Nontraditional Philosophy; POL 1332, Government and Politics of Japan; POL 1371, Government and Politics of China; SOC 1104, Sociology of Japan.

Europe: ART 1204, Renaissance Architecture; ART 1205, Renaissance Art; ECN 1333, European Economic Development; ENG 1652, Twentieth-Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society; LNG 1554, Modern German Film and Literature; LNS 1550, Spanish Civil War in Spanish Film; POL 1306, Politics in Western Europe; POL 1340, Crisis and Change in Central/Eastern Europe; POL 1343,

Politics and Violence in Northern Ireland; POL 1347, Russian Politics After Communism; SOC 1105, Society and Culture in Russia and the Former Soviet Union.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of South America, Latin America, and the Caribbean; POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East; POL 1346, Gender in the Middle East.

Global Dynamics and Development. Students must choose at least two courses from this category:

AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1190/IAF 1190, The Global Economy; ECN 1330, Development Economics; ECN 1335, International Economics: Finance; ECN 1336, International Economics: Trade; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business; INB 1731, Cultural Aspects of International Business; INB 1735, Import and Export Management; PHL 1130, Ethics East and West; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1309, International Political Economy; POL 1313, International Organization; POL 1337, U.S. Foreign Policy; POL 1338, Religion and Politics; POL 1355, Ethnic Conflict; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1104, Cultures of the World; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOA 1430, Latin American Society and Development; SOC 1171, Race and Ethnic Relations: A World Perspective.

Minor in Jewish Studies

The minor in Jewish studies provides students the opportunity to undertake the study of Jewish religion, culture, and history at Northeastern or in combination with courses at Hebrew College in Brookline, Massachusetts, and courses under the study-abroad program. Students take seven courses. A minimum of four courses must be taken at Northeastern.

All students must take PHL 1285, Introduction to Jewish Religion and Culture, and a senior-level directed study or seminar that involves a major research project.

Additional courses at Northeastern. HST 1539, American Jewish History; POL 1384, The Arab-Israeli Conflict; PHL 1315, Understanding the Bible; ENG 1558, Jewish Themes in Literature (Literature in Context); MUS 1185, Music of the Jewish People; SOC 1350, Jewish Women in U.S. Culture; PHL 1325, Responses to the Holocaust; and up to two of the following courses: ED 1423, Ethnic and Multicultural Education; PHL 1110, Introduction to Religion; POL 1338, Religion and Politics; POL 1345, Government and Politics in the Middle East; SOC 1470, Sociology of Religion; SOC 1140, The Sociology of Prejudice.

Students may petition the Jewish studies coordinator to gain Jewish studies credit for any courses not on this list for which they do substantial work in Jewish studies.

Courses at Hebrew College. Students take courses approved by the coordinator of Jewish studies at Northeastern. Students should contact the University registrar, Dean Edmund Mullen, for more information about enrolling at Hebrew College.

Study abroad. Students take courses at Hebrew University, Tel Aviv University, or Ben Gurion University of the Negev under the study-abroad program. Courses must be approved by the coordinator of Jewish studies at Northeastern.

For more information contact the Jewish studies director, Professor Debra Kaufman, at 617.373.4270.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary program drawn from six academic departments (African-American Studies, History, Music, Political Science, Modern Languages, and Sociology/Anthropology). Latin American Studies combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Latin American society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study-abroad programs. It is strongly recommended that students pursuing the minor achieve profi-

ciency in Spanish. Students take six required courses and either complete an internship or co-op experience in a community-based agency or participate in a study-abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

History: AFR 1196, The Black Experience in the Caribbean; HST 1537, Latin America and the Caribbean in Boston; HST 1538, Latinos(-as) in the U.S.; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean History.

Language, literature, music, and religion: ENG 1600, Topics in Literature: U.S. Latino/a Writers; LNS 1250, History of the Spanish Language; LNS 1315, Latin American Literature 1; LNS 1316, Latin American Literature 2; LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and PHL 1265, Latin American Religions.

Social science: POL 1368, Government and Politics of Latin America; POL 1396, Latino Politics in the U.S.; SOA 1133, The Americas from an Indigenous Perspective; and SOA 1430, Latin American Society and Development.

Comparative Studies (courses that include Latin America, the Caribbean, or Latino Society in a comparative context): AFR 1155, Foundations of Black Culture; AFR 1248, Race Relations in America; AFR 1294, Third World Political Relations; ECN 1170, Economic Issues in Minority Communities; ECN 1191/ IAF 1330, Development Economics; ECN 1315, Income Inequalities and Discrimination; HST 1121, World Civilization to 1648; HST 1122/IAF 1122, World Civilization Since 1648; HST 1644, Third World Women; LNS 1500, The Backgrounds of Spanish Culture; LNS 1550, Spanish Civil War in Spanish Film; MUS 1180, Introduction to World Music; POL 1316, Contemporary Revolutionary Politics; POL 1338, Religion and Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture.

For more information, please contact the program coordinator at 617.373.3956.

Minor in Linguistics
Curriculum

Seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, Sociology/Anthropology) collaborate to offer the Minor in Linguistics. Students in many majors find linguistics a compatible major. Courses are cross-listed under LIN and the other departmental prefix and can be used interchangeably in the two areas.

LIN 1118, Introduction to Language and Linguistics 1; LIN 1218, Introduction to Language and Linguistics 2; one of the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1402, Grammars of English; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499/PSY 1499, Psychology of Reading; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

For more information, contact Professor Janet Randall, 617.373.3678, or the Linguistics Program Office in 563 Holmes Hall, 617.373.4553.

Minor in Marine Studies
Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which focuses on oceanographic research and includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617.373.4380.

Minor in Media Studies Curriculum

The media studies minor is intended for students who seek an intense education in the field of mass communication through an exposure to coursework in a number of academic disciplines. Coursework includes theory, criticism, and production. The minor may be taken as a complement to a major in any department or college at the University. Individual programs may be developed with the approval of the chair of the Department of Communication Studies or the director of the School of Journalism. Consult your adviser to determine the course of study most appropriate for your educational goals. Students must complete four courses from the following list to fulfill the minor: CMN 1250, Introduction to Mass Communication; CMN 1450, Television Production*; CMN 1451, Foundations of Electronic Media*; HST 1575, History of Media in America; JRN 1512, Journalism Ethics and Issues. In addition, students must complete four other courses, including one course from each area of the following: ***technical/production:*** ART 1281, Video Basics; CMN 1452, Radio Production*; CMN 1455, Television Field Production; JRN 1421, Television Newswriting; JRN 1422, Television News Production; ***management:*** CMN 1453, Broadcast Management*; CMN 1454, Programming for Radio and Television*; JRN 1508, Law of the Press; ***criticism:*** CMN 1317, The Audience in Mass Communication*; CMN 1620, Television Criticism*; HST 1494, History and Film; INT 1320, Exploring the Humanities through Film. Special Topics courses may apply to the minor when the topics are focused on media. They may be used to fulfill any of the above elective areas.

For further information about the program, contact Professor Nicholas Daniloff, 102 Lake Hall, or Dr. Richard Katula, 103 Holmes Hall.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 *or* ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing *or* ENG 1380, Writing for the Professions: Health Services *or* ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking *or* CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101, Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1226, Modern Architecture: The Twentieth Century; ART 1150, Architectural Design 1.

African-American studies: AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor John Portz, political science, 303 Meserve Hall, 617.373.2796; Professor George Thrush, art and architecture, 309 Ryder Hall, 617.373.2083; Professor Gregory Wassall, economics, 317 Lake Hall, 617.373.2196.

Minor in Women's Studies Curriculum

The Women's Studies program offers students an opportunity to work with respected scholars in a variety of disciplines to examine the human experience through the perspectives of women. This interdisciplinary program examines the importance of gender in societies around the world, past and present. The curriculum encourages students to learn and think about how changing beliefs about women and men have affected research and scholarship in the arts, humanities, and social and natural sciences. Students learn about gender stereotypes, the various ways ideas about gender and sexuality have developed, and the changing situation for women and men today. Key questions are posed that change how people see the world: How does gender influence the kinds of questions we can ask of the world around us? What information can become data when you use gender as a central part of examining a problem? The Women's Studies program coordinates the Boston Area Colloquium on

*These courses require prerequisite courses or permission of instructor.

Feminist Theory lecture series, sponsors talks by scholars on campus, produces the Working Papers in Gender Studies Series, and sponsors the Visiting Research Scholars in Women's Studies series. Women's Studies also works closely with the independent, student-run Women's Center to sponsor programs for Women's History Month and other events of special concern to women students.

To minor in Women's Studies, students take a total of seven courses: SOC 1150 *or* INT 1150 *or* HST 1490, Introduction to Women's Studies; SOC 1302 *or* INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; AFR 1121, African American Literature 1; AFR 1133, History of Blacks in the Media and the Press; AFR 1251, Survey of Black Drama; AFR 1442, African American Women; CJ 1616, Women and the Criminal Justice System; CMN 1232, Gender and Communication; CRS 1503, Human Sexuality and Family Dynamics; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature (when gender related); ENG 1602, Major Figure (when gender related); ENG 1678, Early African American Literature; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1306, Spanish Golden Age Theatre; LNS 1500, Backgrounds of Spanish Culture; LNS 1510, Saints and Sinners; MUS 1106, Women, Gender, and Music; MUS 1800, Directed Study (when gender related); NUR 1303, Life Crisis: Analysis and Response; NUR 1606, Women's Health Choices; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1327, Gender Politics; POL 1328, Women in Public Management; POL 1346, Gender and Politics in the Middle East; PSY 1218, Psychology of Women; PSY 1251, Food, Behavior, and Eating Disorders; SOA 1100, Peoples and Cultures; SOA 1146, Rural Workers in the Third World; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOA 1430, Latin American Society and Development; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; SOC 1217, Women, Health, and Social Change; and SOC 1350, Jewish Women in U.S. Culture. New courses are being developed.

Undergraduate students who want to integrate their interest in women's studies with a major discipline can consult with the Women's Studies coordinator to develop an interdisciplinary major. Plans are under way for a dual major.

Graduate elective courses. CJ 3515, Gender and Justice: Women, Crime, and the Law; CRS 3356, Seminar in Feminist Theory; CRS 3384, Human Sexuality; ENG 3315, Contemporary Critical Theory; ENG 3317, Topics in Criticism: Feminist Literary Theory; ENG 3333, Major Figures in African American Literature; Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3361, European Women's History; HST 3370, Seminar in History of the Family; HST 3398, Seminar in Feminist Theory and Historical Inquiry; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; SOA 3102, Class and State Formation; SOA 3103, Gender, Sexuality, and Culture; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3302, Feminist Methodologies; SOC 3304, Feminist Theory; SOC 3319, Contemporary Religious Identity: A Feminist Focus; SOC 3365, Social Movements; SOC 3412, Contemporary Issues in Sociology when gender oriented; and NUR 1606, Women's Health: Choices and Decision. New courses are being developed and added.

Graduate students interested in women's studies should note that a Graduate Certificate in Women's Studies is now available. To obtain this certificate, students complete a total of five courses: SOC 3302, Feminist Methodologies; SOC 3304, Feminist Theory; and three electives.

Matriculated graduate students can also take courses through Northeastern's affiliated Graduate Consortium in Women's Studies at Radcliffe College. Team-taught courses offered regularly include Feminist Perspectives in Research; Gender, Sexuality, and Culture in Latin American and U.S. Latino/a Society; Telling Lives; Genre and Gender in Women's Life Narratives; and Narratives of Gender and Kinship in Industrializing Societies. Students should apply through the Consortium and can pick up application forms at the Women's Studies Office, 524 Holmes Hall. Consortium courses involve no additional tuition.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Ms. Lihua Wang at 617.373.4984.

Special Programs

Additional information is available from involved departments and the Center for Experiential Education and Academic Advising, One Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Dual Majors

Students with interests in two separate fields have traditionally pursued both by enrolling in a double major (completing all course requirements in both majors), a major and a minor (7–9 courses), or an interdisciplinary major (e.g., Behavioral Neuroscience, Biochemistry, International Affairs). Integrated dual majors are an option for students interested in linking concepts across disciplinary boundaries. In a dual major, faculty in two majors have identified thirteen courses from each major, plus an additional two to four courses that specifically help students link the concepts learned in one major with those in the other. Fulfilling the college's Experiential Education requirement provides an additional opportunity for supervised work linking the two areas. At the present time, the following dual majors have been approved: African American Studies and Psychology; American Sign Language and Human Services; American Sign Language and Psychology; American Sign Language and Theatre; Art and History; Biology and Geology; Biology and Journalism; Biology and Physics; Chemistry and Environmental Geology; Cinema Studies and Communication Studies; Cinema Studies and Modern Languages; Cognitive Psychology and Computer Science; Economics and Philosophy; Economics and Political Science; Economics and Sociology; Economics and Journalism; Journalism and Modern Languages; Journalism and Sociology; Linguistics and Psychology; Mathematics and Biology; Mathematics and Physics; Mathematics and Computer Science; Mathematics and Finance; Mathematics and Finance/Actuarial Sciences; Multimedia Studies and Media Arts and Design; Multimedia Studies and Animation; Multimedia Studies and Photography; Multimedia Studies and Music Technology; Philosophy and Political Science; Philosophy and Environmental Geology; Physics and Computer Science; Physics and Environmental Geology; Political Science and Sociology. Other cross-college dual majors are currently in the University's review process.

Independent Major and Minor

Eligible students may propose an independent major or minor to the College Curriculum Committee. Information concerning eligibility, procedures, and requirements for independent majors or minors is available in the Center for Experiential Education and Academic Advising, One Meserve Hall. Students interested in proposing either should meet with a Dean's Office adviser in the Center before beginning this process. The adviser will help the student locate faculty who may be interested in helping the student with the proposal, as well as a faculty member who may be interested in serving as one of the student's faculty advisers. No student may be considered for an independent major or minor until the proposal has been approved by the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

Bachelor of Arts or Bachelor of Science/ Juris Doctor Degree Program

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

Northeastern University–Hebrew College Exchange

This program offers students the opportunity to register for courses in specialized areas of Jewish studies and Jewish education. See page 36, Minor in Jewish Studies, or contact the University registrar, Linda Allen, 120 Hayden Hall, 617.373.2307, for more information on the registration process for this exchange program.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from the Department of Modern Languages, 400 Meserve Hall, 617.373.2237.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Students use role-playing extensively and practice "intake" interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student seeking co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617.373.3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall at the University of Washington's Friday Harbor Laboratories, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The final phase of the program is conducted at Northeastern's Marine Science Center in Nahant, Massachusetts. For more information, contact Sal Genovese at 781.595.5597.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617.373.4380.

Sea Education Association. The Sea Semester offers a combination land-sea program in marine science, maritime navigation and history, and practical seamanship with deep-water oceanographic research. A six-week sea voyage, often to the Caribbean or the Canadian Maritimes, provides hands-on experience.

The Center for the Arts

The primary mission of the Center for the Arts is to support and develop the arts as a vital and integral component of the Northeastern community. Through a variety of mainstage and artist-in-residency programs, featuring performing and visual artists acclaimed for their excellence, the center complements the academic arts departments in their effort to educate Northeastern students in becoming knowledgeable, discriminating, and active participants in the arts. In addition, the center supports curriculum-oriented arts projects and events, encourages interdepartmental collaborations, develops exhibitions and presentations that serve the on-campus community as well as the general public, provides multicultural arts programs, and acts as a primary facilitator for research in the arts.

The center also manages the Blackman Auditorium Theatre Complex and operates the Northeastern University Ticket Center. Tickets to and information about performing and visual arts events and other campus events are available in the ticket center as are tickets and passes to Boston area dance, music, theatre, film, and visual arts events. The ticket center also provides free passes and maintains a University membership to the Museum of Fine Arts that entitles all undergraduate students in the full-time day programs to free membership privileges.

For information on arts activities, please call the Center for the Arts office at 617.373.2249. For ticket information, call the ticket center at 617.373.2247.

Study Abroad

The College of Arts and Sciences strongly endorses the importance of an international experience as a dimension of learning. To foster this, it maintains an Office of International Study Programs that has developed a series of programs tailored to the interests and needs of Northeastern University students. Students who successfully complete a college study-abroad program are considered to have fulfilled the college's experiential education requirement.

Students who wish to pursue a particular program sponsored by Northeastern University or another institution should arrange to discuss the program in which they are interested with the Coordinator of International Study Programs, One Meserve Hall, 617.373.5162, and with one of the Dean's Office academic advisers in the Center for Experiential Education and Academic Advising, One Meserve Hall, to ensure that credits granted through study abroad will be applicable to their program in the college. Students who participate in Northeastern-sponsored study-abroad programs maintain their full-time Northeastern status, and their grades will be calculated into their QPA.

The general requirements for participation in all Northeastern University study-abroad programs are: middler-year standing or above, and QPA of 3.0 or higher. The Office of International Study Programs maintains a rolling admission policy for most programs; early application is advised.

Africa/Middle East

Ghana, Accra: University of Ghana. Offers students an opportunity to study West African history, politics, music, literature, and culture, and to learn how to speak Twi. All courses are taught in English.

South Africa, Cape Town: University of Cape Town. Allows students to pursue their studies while providing first-hand knowledge of contemporary South African life and society in one of the world's most beautiful cities.

Egypt, Cairo: American University of Cairo. Offers students an opportunity to study Egyptian and Arabic history, culture, and contemporary issues. Courses are taught in English and are available in most arts and sciences majors.

Israel, Tel Aviv: Tel Aviv University. Live and study in the cultural and commercial center of modern Israeli life. Taught in English, courses are available in most arts and sciences disciplines, with an emphasis on Middle Eastern and Jewish studies.

Americas

Argentina, Buenos Aires: Universidad del Salvador. Allows students fluent in Spanish to live and study in the heart of one of South America's most successful new democracies. Courses are taught exclusively in Spanish.

Canada, Vancouver: Simon Fraser University. Provides students with the opportunity to learn about the politics, geography, economies, and cultures of Canada and the Pacific Rim countries. Courses are available in all arts and sciences disciplines.

Chile, Santiago: Pontificia Universidad Catolica de Chile (PUC). Offers students with an advanced knowledge of Spanish the opportunity to study in this beautiful and dynamic country, living with a host family. Students may choose from the full course catalog.

Mexico, Puebla: Universidad de las Americas-Puebla (UDLA). Allows students to learn about North American political and social issues from a Mexican perspective. Each semester some social science courses are taught in English. Students may also enroll in regular university courses taught in Spanish.

Sea Education Association (SEA). Offers a combination land-sea program in marine science and maritime navigation and history with practical seamanship skills and oceanographic research. A six-week sea voyage to the Caribbean or the Canadian Maritime provides hands-on experience.

Asia

China, Hong Kong: Chinese University of Hong Kong. Allows students to experience the dramatic process of integrating two distinct cultures—traditional, Communist China with westernized, capitalist Hong Kong. Classes are taught in English in most arts and sciences majors.

Malaysia, Penang: University of Malaya. Provides students with the opportunity to study in a unique and multicultural Southeast Asian country. Classes are taught in English in many arts and sciences majors.

Singapore, Jurong: Nanyang Technological University (NTU). This program offers traditional arts and sciences courses (taught in English), as well as Malay and Tamil language and culture in southwestern Singapore.

Viet Nam, Ho Chi Minh City: School for International Training. Based at the University of Ho Chi Minh City, this program emphasizes independent field study and travel as well as classroom learning. Classes are taught in English.

Australia/New Zealand

Australia: Various Locations. Students may choose to study at universities located across the continent: Curtin University in Perth, University of Sydney, Monash University in Melbourne, or Bond University in the Gold Coast. Each program offers courses in a variety of arts and sciences disciplines as well as the opportunity to live with Australian students.

New Zealand: Various Locations. Students may study at the University of Canterbury (Christchurch) or the University of Auckland on the North Island. Each offers courses in most majors as well as the opportunity to live and study with New Zealander students.

Europe

Belgium, Leuven: Irish Institute for European Affairs. Parliamentary Internship. Designed to offer students an opportunity to learn about the history, organization, and operation of the European Union. Courses, taught in English, focus on politics, economics, and history. Includes a research internship with a member of the European parliament.

Czech Republic, Prague: Charles University. Focuses on Czech history, politics, literature, and culture in a city known not only for its beauty but also for its vibrancy. All courses are taught in English.

England, Cambridge: University of Cambridge. In this intensive six-week summer program, students choose to study in one of six specialty programs: Humanities and Social Sciences, Art History, History, Medieval Studies, Shakespeare, and English Literature. Teaching is in small seminar classes. Students may also participate in numerous activities and field trips.

England, London: Goldsmiths' College. Offers a wide variety of courses in art, theater, education, English, history, politics, psychology, and sociology through Goldsmiths' regular course catalog. They also have a world-renowned Communications Department. Students have the opportunity to live with other Goldsmiths' students.

England, London: The Hansard Scholars Program. Parliamentary Internship. Combines courses in British society and government with an academic internship. Recent sites included the British Parliament, BBC, and other local political agencies. Courses are taught at the London School of Economics.

France, Paris: American University of Paris. Offers students the opportunity to live and study in the heart of Paris. Courses are taught in English and are available in most arts and sciences disciplines.

Hungary, Budapest: Technical University. Allows students to see the dramatic changes occurring in Eastern Europe. The courses, taught in English, focus on the social sciences.

Ireland, Dublin and Belfast: North and South Internship Program. The Institute of Public Administration, Dublin (fall quarter) and/or Queen's University, Belfast (winter quarter): Offers students classes in literature, sociology, political science, and history; the fall quarter includes an internship in the Irish Parliament; the winter quarter includes a short-term internship with a public service organization.

Italy, Florence: Studio Arts Center International (SACI). Located in the heart of Florence, SACI is designed for studies in studio art, art history, photography, and architecture. Courses are taught in English.

Spain: University of Alicante and University of Seville. Students may choose to study in one of two historic and beautiful cities. Alicante is for students with a basic knowledge of Spanish—courses are taught in English. In Seville, courses are taught exclusively in Spanish.

Russia

Russia: Various Locations. Offers students the choice of studying in Yaroslavl, Vorenezh, and Vladivostok. Classes, taught in Russian, focus on the cultures, economics, and politics of Russia today.

For more information on the study abroad program contact Todd Rich or Beth Rascoe, Office of International Study Programs, Center for Experiential Education and Academic Advising, One Meserve Hall, 617.373.5162, fax 617.373.7768, or e-mail trich@casdn.neu.edu.

African-American Studies

Robert L. Hall, PhD, *Associate Professor and Chair*

College of Arts and Sciences

Distinguished Professor
Patrick Manning, PhD
History

Professor
Ronald W. Bailey, PhD
Black Studies

Associate Professors
Jordan Gebre-Medhin, PhD
Anthropology
William Lowe, MA
Music
Kwamina Panford, PhD
Law, Policy, and Society

Assistant Professors
Leonard L. Brown, PhD
Music
Robin Chandler, PhD
Sociology and Art
Elizabeth B. Cole, PhD
Psychology

Associated Faculty
Oscar Brookins, PhD
Economics
Edward A. Bullins, MFA
Theatre
Donald M. Jacobs, PhD
History
William F. Miles, PhD
Political Science
Peter C. Murrell, PhD
Education

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the field of African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns. Plans for a study-abroad program are under way.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies. See pages 132–134 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; one course on the black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses that will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

American Sign Language–English Interpreting

Dennis R. Cokely, PhD, *Associate Professor and Director*

Lecturers
Alma L. Bournazian, MS
James Lipsky, BS

American Sign Language (ASL) is a language used by large numbers of people in the United States and Canada. By mastering ASL, students gain both access to the culture of Deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England. See pages 135–136 for course descriptions.

Bachelor of Science Curriculum

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL 1508, ASL-English Interpreting 1, 2, 3, and 4; ASL 1520, Interpreter Role and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, ASL 1821, Interpreting Practicum 1 and 2; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and THE 1155, Voice for the Theatre.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 33).

Art and Architecture

Elizabeth C. Cromley, PhD, *Professor and Chair*

Professor
Mardges Bacon, PhD

Associate Professors
Edwin C. Andrews, MFA
Mira Cantor, MFA
Julie M. Curtis, MFA
T. Neal Rantoul, MFA
George H. Thrush, MArch

Assistant Professors
Ann L. McDonald, MFA
Thomas Starr, MFA
Peter H. Wiederspahn, MArch

Lecturers
Hani R. Asfour, MArch
Cynthia L. Baron, MBA
Nathan W. Bishop, BS
Edith M. Bresler, BFA
Nathaniel Coleman, PhD
David A. Conant, MArch
E. Margaret Curley-Clay, MFA
John Kane, BA
Douglas K. Kornfeld, MFA
Mark J. Laughlin, BFA
Stefanie London, MFA
Mary L. Marino, BFA
Wallace F. Marosek, MFA
Mark E. Pasnik, MAUD
Nina R. Pattek, MFA
Neil Rennie, MFA
Francisco J. Rodriguez, MArch
H. Mark Schatz, MArch
Charlotte L. Schulz, MFA
Norma Steinberg, PhD
Robert E. Trumbour, MArch
Lawrence C. Volk, MFA

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, media arts and design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Students wishing to be accepted to the art major or minor as internal transfer students must petition the department chair. Acceptance into the major will be based on students having met the department's criteria for admission (see *Arts and Sciences Guidebook*) and availability of space in the program. See pages 137–142 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

Major in general art. ART 1100, History of Art to 1400, and ART 1101, History of Art Since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in architecture. Leading to a BS degree, which is not a professional degree in architecture. The twelve art electives are replaced by five architectural history courses: ART 1111 and ART 1112, Introduction to World Architecture 1 and 2; ART 1204, Renaissance Architecture; ART 1225 and ART 1226, Modern Architecture 1 and 2. ART 1100, History of Art to 1400 and ART 1101, History of Art Since 1400 are electives.

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1341, 1342, Architectural Design 1 to 6; and ART 1352, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer-Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Major in Media Arts and Design. Students who transfer in media arts and design must maintain a 2.667 average in all required major courses after three quarters. Students who fail to meet the above standards will be placed on departmental probation. Students who remain on probation for three consecutive quarters will be dropped from the major. The department has the discretion to dismiss a student who fails two departmental courses or receives three Ds in departmental courses. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190,

Introduction to Computer Graphics; ART 1213, Modern Art; ART 1240, History of Graphic Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; ART 1330, Advanced Visual Communication; and one art history elective and ten open electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Multimedia studies dual major. The multimedia studies dual major (Departments of Music and Art and Architecture) combines coursework in the students' primary disciplines with courses outside their own fields. For capstone courses, students work in cross-disciplinary teams, developing and delivering original multimedia content. The three areas of specialization required for students pursuing multimedia studies in art are: animation, media arts and design, and digital photography, which will become available over the next three years.

Students wishing to apply for admittance into the multimedia studies dual major must have achieved an overall QPA of at least 3.25 to be considered.

Admission is limited and highly selective. Applicants not accepted into the program remain in good standing in their current major or concentration, provided they meet the departmental guidelines. Candidates may apply to the program a second time, but this could impact the length of their studies at the University.

At the beginning of the spring quarter of their sophomore year, students submit their application for admittance to the program to the department of art and architecture. This application includes examples of the student's creative work. Students applying to the multimedia studies dual major may choose a faculty advocate who will serve as the student's spokesperson during the admissions process. It is the student applicant's responsibility to ensure that the faculty advocate is well informed about his/her academic record and portfolio.

The application is reviewed by the multimedia admissions review committee, and the student is advised of the committee's decision no later than the middle of the spring quarter. The committee consists of faculty members from the multimedia studies program and might include individuals from outside the program or the University.

Students must maintain an overall QPA of at least 3.25 to graduate with a major in multimedia studies. Students whose QPAs fall below this level are not allowed to enroll in the major's senior-level capstone courses.

Media arts and design, animation, and digital photography students accepted into the dual major in multimedia studies must take all required courses in their major or concentration plus the following nine multimedia studies requirements: ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; ART 1160, Introduction to Photography; ART 1171, Animation Basics; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; MUS 1100, Introduction to Music; MUS 1170, Music and Technology; MUS 1172, Introduction to Music Recording; six interdisciplinary requirements: CMN 1451, Foundations of Electronic Media; HST 1494, History and Film *or* HST 1495, Technological Transformations of Society; HST 1575, History of Media in America; LNF 1551, Film Theory; Law and Media; Scripting for Interactivity; and two capstone multimedia projects 1 and 2.

Concentration in animation: Five requirements in animation concentration: ART 1171, Animation Basics; ART 1175, Animation Studio 1; Animation Studio 2; Animation Studio 3; Animation Studio 4; six art and architecture requirements: ART 1100, History of Art to 1400; ART 1101, History of Art Since 1400; ART 1124, Basic Drawing; ART 1131, Visual Studies Foundation 2; ART 1213, Modern Art; and ART 1250, Color Theory and Practice.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in graphic design: Six requirements in media arts and design: ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1243, Graphic Design 2; ART 1144, Typography 2; ART 1280, Media Graphics *or* ART 1290, Electronic Publishing Design; ART 1244, Graphic Design 3; Interactive Design; six art and architecture requirements: ART 1100, History of Art to 1400; ART 1101, History o Art Since 1400; ART 1124, Basic Drawing; ART 1131, Visual Studies Foundation 2; ART 1213, Modern Art; ART1250, Color Theory and Practice; seventeen requirements for multimedia studies dual major: MUS 1100, Introduction to Music; MUS 1170, Music and Technology; MUS 1172, Introduction to Music Recording; ART 1180, Video Basics; ART 1130, Visual Studies Foundation 1; ART 1160, Introduction to Photography; ART 1132, Principles of Graphics; ART 1190, Introduction to Computer Graphics; ART 1171, Animation Basics; CMN 1451, Foundations of Broadcast Technology HST 1575, History of Media in America; HST 1494, History and Film *or* HST 1495, Technological Transformations of Society; LNF 1551, Film Theory; Law and Multimedia; Scripting for Interactivity; Multimedia Projects 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in photography: Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1185, Still Digital Imaging; ART 1190, Introduction to Computer Graphics; ART 1195, Intermediate Digital Photography; ART 1213, Modern Art; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1261, Intermediate Black-and-White Photography; ART 1263, Introduction to Color Photography; ART 1264, Color Photography 2; ART 1305, Alternative Photographic Processes; ART 1354, Portfolio Review; ART 1363, Advanced Photography Seminar; and one directed study as thesis capstone in the concentration; and one art history elective. The remainder of courses are to be taken in College of Arts and Sciences core and general elective courses.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

General art minor. Select any six courses from the departmental curriculum for which you have the prerequisites.

Minor in history of architecture. ART 1111, ART 1112, Introduction to World Architecture 1 and 2; ART 1204, Renaissance Architecture; ART 1223, American Architecture; ART 1225, Modern Architecture: The Nineteenth Century; ART 1226, Modern Architecture: The Twentieth Century; and ART 1310, Seminar in Modern Architecture.

Minor in architecture. ART 1111, ART 1112, Introduction to World Architecture 1 and 2; ART 1124, Basic Drawing *or* ART 1156, Architectural Drafting; *or* GE 1130, Engineering Design and Graphics; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; *or* ART 1295, Computer Aided Design; *or* ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; Art 1133, Graphic Design 1; and ART 1254, Intermediate Drawing.

Minor in media arts and design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1185, Still Digital Imaging; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1305, Alternative Photographic Processes *or* ART 1264 Color Photography 2.

The sophomore portfolio review. As part of the progression through the Department of Art and Architecture, all students are required to assemble and submit a portfolio of their best works from their freshman and early sophomore years for review by the faculty. Evaluation of the student work will be done on a pass/fail basis. In order to proceed to upper level courses in the department, students must pass ART 1354, Sophomore Portfolio Review.

Behavioral Neuroscience

The behavioral neuroscience major is an interdepartmental program for undergraduates, with a head adviser/director and an advisory board made up of the neuroscience faculty of the College of Arts and Sciences. The overall objectives of the neuroscience major are to draw together faculty and students who are interested in this interdisciplinary topic and to provide undergraduates with an education in the field. Behavioral neuroscience focuses on brain mechanisms and how they give rise to behavioral functions in humans and animals. The field combines the disciplines of biology and psychology with a strong background in basic physical sciences and mathematics. The goal is to achieve an understanding of nerve cells, chemical neurotransmission, simple neural circuits and other physiological systems and then to see how they give rise to normal and pathological behavioral functioning. The curriculum prepares students to find employment in allied fields such as the biotech industry or to gain entrance to higher degree granting programs in graduate or medical school. For further information on the behavioral neuroscience major, contact Frederick Davis, professor of biology, at 617.373.4039.

Bachelor of Science Curriculum

Psychology: PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2; PSY 1211, Behavioral Statistics 1; PSY 1212, Behavioral Statistics 2; PSY 1351, Psychobiology; PSY 1451, Psychopharmacology; PSY 1551, Psychobiology Laboratory.

One course from the following: PSY 1241, Developmental Psychology; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1.

Two courses from the following: PSY 1231, Learning and Motivation 1; PSY 1262, Psychology of Language; PSY 1353, Animal Behavior; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1381, Sensation; PSY 1382, Perception.

Biology: BIO 1100, Principles of Biology 1*; BIO 1101, Principles of Biology 2*; BIO 1282, Genetics; BIO 1283, Introductory Biochemistry; BIO 1355, Regulatory Cell Physiology*.

Two courses from the following: BIO 1321, Evolution*; BIO 1343, Vertebrate Zoology*; BIO 1346, Embryology*; BIO 1356, Comparative Vertebrate Anatomy*; BIO 1452, Comparative Neurobiology; BIO 1473, Systems Physiology; BIO 1474, Neuroethology*; BIO 1462, General Biochemistry Laboratory; BIO 1463, Cellular Biochemistry; BIO 1467, Molecular Biology.

Mathematics and Chemistry: MTH 1106, Functions and Algebra, MTH 1107, Functions and Calculus, and MTH 1108, Calculus; *or* MTH 1133, 1134, and 1135, Calculus for Biology Majors 1, 2, and 3; CHM 1111, General Chemistry for the Life Sciences 1; CHM 1122, General Chemistry for the Life Sciences 2B; CHM 1264, Organic Chemistry for Biology Science Majors 1; CHM 1265, Organic Chemistry for Biology Science Majors 2.

Seminar: PSY 1651, Seminar in Neuropsychology.

BS Core Curriculum: For natural science majors.

*Courses with required laboratories.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Science Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1461, General Biochemistry; BIO 1462, General Biochemistry Lab; BIO 1463, Cellular Biochemistry; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1122, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3 *or* CHM 1264, CHM 1265, Organic Chemistry for Biology Science Majors 1 and 2; CHM 1273, Organic Chemistry for Chemistry Majors 3; and CHM 1381, CHM 1382, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus for Science Majors 1, 2, and 3 *or* MTH 1133, MTH 1134, MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Majors 1, 2, and 3; two quarters of corresponding physics lab courses; four advanced biology and chemistry electives (minimum of one from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 33).

Biology

Edward L. Jarroll, PhD, *Professor and Chair*

Matthews Distinguished University Professor
Phyllis R. Strauss, PhD
Carol M. Warner, PhD

College of Arts and Sciences Distinguished Professor
Wendy A. Smith, PhD

Professors
H. William Detrich, PhD
Gwilym S. Jones, PhD
James M. Manning, PhD
Richard L. Marsh, PhD
Charles A. M. Meszoely, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD

Associate Professors
Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Frederick C. Davis, PhD
Charles H. Ellis, Jr., PhD
Helen H. Lambert, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD

Assistant Professors
Slava S. Epstein, PhD
Donald M. O'Malley, PhD
L. David Smith, PhD

Professors Emeriti
Charles Gainor, PhD
Nathan W. Riser, PhD
David C. Wharton, PhD

Adjunct Professors
Bruce B. Collette, PhD
Sergei Kashin, PhD
Kenneth Sebins, PhD

Adjunct Associate Professor
David Carc, MD, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology/microbiology, molecular biology, plant biology, zoology, etc. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middler year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

A marine biology concentration designed to provide biology majors with a strong foundation in marine biology and related disciplines, is now offered through the Northeastern University Marine Science Center in Nahant. The concentration combines specific coursework in marine biology, research projects in thematic areas that represent ongoing Marine Science Center research, and cooperative education opportunities in the marine fields. Marine biology concentration students may also participate in the East/West Marine Biology program and the Marine Science Center summer program. Contact Sal Genovese at 781.595.5597 for more details, or visit the Website at http://www.dac.neu.edu/msc/.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical or predental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

See pages 142–148 for course descriptions.

Bachelor of Arts Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1222, Environmental and Population Biology; BIO 1611, Environmental and Population Biology Lab; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; BIO 1494, Capstone in Biology; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Functions and Algebra, MTH 1107, Functions and Basic Calculus, and MTH 1108, Calculus (one year); *or* MTH 1133, MTH 1134, and MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1201 and PHY 1202, *or* PHY 1203, Physics for the Life Sciences 1 and 2, *or* 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science and Engineering Students 1 and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

BIO 1100, BIO 1101, BIO 1102, Principles of Biology 1, 2, and 3; BIO 1600, BIO 1601, BIO 1602, Principles of Biology 1, 2, and 3 Lab; BIO 1222, Environmental and Population Biology; BIO 1611, Environmental and Population Biology Lab; BIO 1282, Genetics; BIO 1660, Genetics Lab; BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; BIO 1494, Capstone in Biology; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Functions and Algebra; MTH 1107, Functions and Basic Calculus; and MTH 1108, Calculus; *or* MTH 1133, MTH 1134, and MTH 1135, Calculus for Biology Majors 1, 2, and 3; PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 *or* PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor adviser before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 617.373.2260.

Biomedical Physics

Faculty listed under Physics

At the most basic level, biomedical physics seeks to understand the role of physical processes occurring on molecular, cellular, or macroscopic scales, in vital biological functions, ranging from the extraction of oxygen from the lungs by red blood cells to the generation of complex electrical signals in the brain and nervous system. At the most practical level, biomedical physics examines how physical principles and modern instrumentation techniques can be used in a rapidly increasing number of medical applications, ranging from imaging tissue structures and organ functions, to detecting and curing diseases, to performing sophisticated surgeries.

The biomedical physics major sponsored by the physics department helps students understand the interrelationships between physics, biology, and medicine, at both fundamental and practical levels. Students acquire a strong interdisciplinary training in science. This training combines formal classwork in physics, biology, computer science, and mathematics, with practical seminar courses in medical imaging, medical applications of lasers and optical techniques, and radiation therapy. The latter courses are given by expert practitioners from local hospitals and institutions (e.g., Massachusetts General Hospital, Harvard Medical School), and are designed to help students make the connection between the real-world clinical environment and classroom learning.

Students have the opportunity, through Northeastern's program of cooperative education, to further their educational experience by working in various biotechnology companies, medical instrumentation companies, and local hospitals. Students also have the opportunity to participate in research projects with faculty members doing research in biophysics and biomedical-related areas. Undergraduate research fellowships awarded by the physics department are available for particularly able students.

The biomedical physics major prepares students for a broad range of careers and graduate study options in biomedical-related areas. Students can choose to find direct employment in various industrial or hospital facilities as well as in companies involved in developing and manufacturing medical devices, biomaterials, and instrumentation. They can also choose to attend medical school, to pursue advanced degrees in physics, biophysics, or biomedical engineering, or to enter a professional graduate program in biomedical physics.

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, and PHY 1533; PHY 1300, Physics with Computers; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551, PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1421, Biological Physics 1; PHY 1423, Medical Physics; PHY 1451, Medical Imaging; PHY 1452, Radiation Therapy; and PHY 1453, Applications of Lasers in Medicine.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, Calculus for Science Majors 1, 2, 3, and 4; CHM 1111, CHM 1122, General Chemistry for Life Science 1 and 2B; BIO 1108, General Biology; BIO 1109, Animal Biology; BIO 1355, Regulatory Cell Physiology; and three additional science electives from those approved for majors in physics, mathematics, computer science, engineering, and biology.

Chemistry

David A. Forsyth, PhD, *Professor and Chair*

Matthews Distinguished University Professor
Geoffrey Davies, DSc

Professors
Terry K. Baker, DSc
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
William M. Reiff, PhD
John L. Roebber, PhD
Paul Vouros, PhD
Philip M. Warner, PhD

Associate Professors
Thomas R. Gilbert, PhD
David J. Jebaratnam, PhD
Alex K-Y Jen, PhD
Graham B. Jones, PhD, D.I.C.
Rein U. Kirss, PhD
Ira S. Krull, PhD
Patricia A. Mabrouk, PhD
Nelly M. Rodriguez, PhD

Assistant Professors
David E. Budil, PhD
Sanjeev Mukerjee, PhD

Laboratory Coordinator
Edward H. Witten, PhD

Professor Emeritus
Alfred Viola, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their coursework into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas that have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

The Department of Chemistry offers two degree programs. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

The Department of Chemistry also offers a Bachelor of Science with an Interdisciplinary Option. In this program some of the courses required for a traditional BS in chemistry have been replaced with required and elective courses focused on one of several disciplines, including business administration, education, environmental science, and law and public policy. The options are offered because chemists frequently take jobs that require knowledge and skills not provided by the traditional chemistry major program. The options programs add breadth to the curriculum for chemistry majors while still providing a technical core of math, physics, and chemistry courses. More information about these options are contained in the pamphlet *Options for Chemistry Majors* available from the Chemistry Department. See pages 148–151 for course descriptions.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab. To fulfill the college's experiential education requirement, all BA candidates must choose one of the following options: CHM 1800, CHM 1802, CHM 1803, CHM 1804, or CHM 1805, Undergraduate Research.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 *or* MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Advanced Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives. To fulfill the college's experiential education requirement, all BS candidates must choose one of the following options: CHM 1800, CHM 1802, CHM 1803, CHM 1804, or CHM 1805, Undergraduate Research.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

Bachelor of Science with an Interdisciplinary Option

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; MTH 1133, MTH 1134, MTH 1135, Calculus 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics 1, 2, and 3; PHY 1501, PHY 1502, PHY 1503, Physics Lab 1, 2, and 3; and two math or science electives and the required and elective courses in the interdisciplinary area.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 and 2; CHM 1274, Organic Chemistry 3: The Organic Chemistry of Living Process; or CHM 1264, CHM 1265, Organic Chemistry 1 and 2; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

TBA

Associate Professors
Karen S. Buzzard, PhD
Richard Katula, PhD
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professor
Kevin Howley, PhD

Lecturer
Sam Lotuff, MA
Elizabeth Threnhauser, PhD

Communication studies offers students a humanities-based, liberal arts education coupled with preprofessional training.

Students who major in communications learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

Students who wish to transfer to the communication studies major must meet the department's criteria for acceptance (see *Arts and Sciences Guidebook*). In addition, space in this program is limited, so students may be admitted on a space-available basis. See pages 151–153 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1330, Interpersonal Communication; CMN 1430, Organizational Communication; CMN 1450, Television Studio Production *or* CMN 1452, Radio Production; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three adviser-approved communication studies courses are required to complete the major and, in some cases, CMN 1650, Senior Seminar in Communications.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1300, Communication Theory; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; CMN 1500, Special Topics in Communication Studies; and CMN 1554, Special Topics in Media.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1554, Special Topics in Media; and CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315 Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1500, Special Topics in Communication Studies; CMN 1554, Special Topics in Media; and CMN 1899, Advanced Television Production.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism. Individual programs may be approved through the Communication Studies Department.

Economics

Steven A. Morrison, PhD, *Professor and Acting Chair*

Professors
M. Shahid Alam, PhD
Barbara M. Fraumeni, PhD
Daryl Hellman, PhD
Sungwoo Kim, PhD
Gustav Schachter, PhD
Andrew M. Sum, MA

Associate Professors
Neil O. Alper, PhD
Oscar T. Brookins, PhD
Kamran M. Dadkhah, PhD
Alan W. Dyer, PhD
Gregory H. Wassall, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and identify policies that contribute to economic stability and progress.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the developing world and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services. See pages 153–156 for course descriptions.

Bachelor of Arts Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1220, History of Economic Thought; ECN 1250, Statistics; and eight other economics courses, of which at least six must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; MSC 1226, Computer-Based Information Systems *or* COM 1105, Computer Science and Its Applications; and four social science electives other than economics.

In order to graduate with a BA in economics, a student must earn an average grade of C (QPA = 2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1220.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1250, Statistics; ECN 1260, Problems in Economic Research; and twelve other economics courses, of which at least nine must be upper-level (non-Pathway) electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; MSC 1226, Computer-Based Information Systems *or* COM 1105, Computer Science and Its Applications; and four social science electives other than economics.

In order to graduate with a BS in economics, a student must earn an average grade of C (QPA = 2.00) or better in the four core courses, ECN 1215, ECN 1216, ECN 1250, and ECN 1260.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and six other courses in economics, of which at least two must be upper-level (non-Pathway) electives and one must be ECN 1250, Statistics, or equivalent (unless a comparable course is required by the major department). Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

TBA

Professors
James W. Fraser, PhD
Maurice Kaufman, PhD
Mervin D. Lynch, PhD

Associate Professors
Joseph Meier, EdD
Peter C. Murrell, PhD

Visiting Associate Professor
Robert Fried, PhD

Assistant Professors
Thomas H. Clark, MA
Terry L. Haywoode, PhD

Professors Emeriti
Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
John D. Herzog, PhD
Irene A. Nichols, EdD
Sandra M. Parker, EdD
Barbara A. Schram, EdD

The School of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain advanced provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department. The education program courses are listed below. For arts and sciences major program requirements, refer to the appropriate major section in this catalog. See pages 156–158 for course descriptions.

Early Childhood Education and Elementary Education

Students seeking certification as early childhood (grades pre-K–3) or elementary education (grades 1–6) teachers must complete the requirements for the Bachelor of Arts degree or the Bachelor of Science degree, including a major in the arts and sciences, the arts and sciences core curriculum, and a program of education courses.

Early childhood education program. CRS 1200, Introduction to Special Education; ED 1101, Introduction to Education; ED 1102, Child Development, Learning, and Education; ED 1104, Learning and the Teaching Process; ED 1319, Speech, Language, and Cognition in the Young Child; ED 1405, Teaching Children's Literature and the Arts; ED 1407, Integrating the School Curriculum through Social Studies; ED 1417, Student Teaching Practicum and Seminar; ED 1420, Student Teaching Practicum in the Pre-K Years; ED 1421, Curriculum for the Pre-K years; ED 1425, Teaching Mathematics and Science to Children; ED 1426, Teaching the Language Arts; ED 1470, Freshman Seminar; ED 1480, Junior/Senior Seminar for Education Students; HSL 1270, Health and Motor Development in Early Childhood.

Elementary education program. CRS 1200, Introduction to Special Education; ED 1101, Introduction to Education; ED 1102, Child Development, Learning, and Education; ED 1104, Learning and the Teaching Process; ED 1405, Teaching Children's Literature and the Arts; ED 1407, Integrating the School Curriculum through Social Studies; ED 1417, Student Teaching Practicum and Seminar; ED 1425, Teaching Mathematics and Science to Children; ED 1426, Teaching the Language Arts; ED 1470, Freshman Seminar; ED 1480, Junior/Senior Seminar for Education Students; HSL 1180, Health and Physical Education in the Elementary School.

Special education certification. Students who complete the early childhood education or elementary education program may prepare for special education certification by completing the following courses: CRS 1200, Introduction to Special Education; CRS 1315, Introduction to Etiology and Development of Special Needs; CRS 1316, Introduction to Assessment, Program Planning, and Implementation in Special Education; ED 1103, Adolescent Development, Learning, and Education.

Secondary Education

Students seeking middle-school or high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.

Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.

Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Adolescent Development, Learning, and Education; ED 1104, Learning and the Teaching Process; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Secondary-School Curriculum Development; and ED 1417, Student Teaching and Seminar.

Student Teaching

Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

Teacher certification is awarded by the Commonwealth of Massachusetts. Students must satisfactorily complete other requirements of the Commonwealth of Massachusetts to obtain certification. These include a Massachusetts Educator Certification Test.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors
Samuel J. Bernstein, PhD
Robert J. Blanch, PhD
Francis C. Blessington, PhD
Irene Fairley, PhD
Wayne Franklin, PhD
Gary Goshgarian, PhD
Guy Rotella, PhD
Michael Ryan, PhD
Arthur J. Weitzman, PhD

Associate Professors
Kathy Howlett, PhD
Kathleen Kelly, PhD
Marina Leslie, PhD
Mary K. Loeffelholz, PhD
Janet Randall, PhD
Bonnie TuSmith, PhD
Susan Wall, PhD

Assistant Professor
Elizabeth C. Britt, PhD

Lecturers
Joseph B. deRoche, MFA
David W. Tutein, MA

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science. See pages 158–164 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Literary Interpretation; three period courses; two major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and four electives in English.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in creative writing. ENG 1351, Creative Writing; one course from the following: ENG 1356, Drama Workshop; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop; ENG 1360, Topics in Writing; and ENG 1362, Publication Arts.

Concentration in literature. One language or writing course from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Nonfiction Workshop.

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; ENG 1126, Backgrounds in English and American Literature *or* ENG 1307, Literary Interpretation; two English courses in literature at the 1200 level or above *or* one course in literature at the 1200 level or above and one linguistics course at any level; and one junior/senior seminar.

Minor in Writing Curriculum

Six courses required, five from the following: ENG 1118, Introduction to Language and Linguistics; ENG 1119, History of the English Language; ENG 1125, Technical Writing 1; ENG 1350, Writing for the Professions; ENG 1351, Creative Writing; ENG 1352, Advanced Writing; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1359, Non-Fiction Workshop; ENG 1362, Publication Arts; ENG 1370, Technical Writing 2; ENG 1380, Writing for the Health Professions; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; and one elective.

Minor in Linguistics Curriculum

See page 33.

Minor in Technical Communication Curriculum

See page 33.

Environmental Studies

Professors
Geoffrey Davies, DSc
Chemistry
Gwilym Jones, PhD
Biology
Anthony Penna, DA
History

Associate Professors
Christopher Bosso, PhD
Political Science
Thomas R. Gilbert, PhD
Chemistry
Malcolm D. Hill, PhD
Geology
William D. Kay, PhD
Political Science
Judith Perrolle, PhD
Sociology/Anthropology
Peter S. Rosen, PhD
Geology

Assistant Professor
Daniel Faber, PhD
Sociology/Anthropology

The environmental studies major is an interdisciplinary program designed for students who wish to apply an understanding of both social and scientific issues to the solution of environmental problems. The goal of the major is to enable students to conceptualize and to attack "unstructured problems" (i.e., problems with many more variables than equations, or problems for which there may be no obvious single best solution). This type of problem dominates natural environmental systems; the solutions to environmental problems may require balancing scientific and societal concerns. By the time students graduate, they should be able to identify an environmental problem, develop a plan to address the problem, identify and organize the resources that they would need to solve the problem, and know how to implement a plan to solve the problem.

The major is structured to provide progressive development in skills and knowledge. It is flexible in that it allows latitude in upper-level course choices, selected with the approval of a faculty adviser, to suit individual student interests. Students are strongly encouraged to complete a dual major combining environmental studies and another major; course lists for specific pairings are available from the faculty or from the College of Arts and Sciences Dean's Office. Students first complete ten environmental studies prerequisite courses and two interdisciplinary environmental core courses: one to help link across two of the science prerequisite courses, and the other to focus on environmental policy making. With approval from faculty advisers, students select a set of eight upper-level electives, participate in a one quarter-hour environmental seminar, and complete a four quarter-hour field experience (which will also satisfy the college's Experiential Education Requirement). The capstone course/senior thesis provides an opportunity to participate with other students in a team-based approach to environmental problem solving.

Bachelor of Arts Curriculum

Prerequisites: SOA 1104/IAF 1104, Cultures of the World *or* SOA 1100, Peoples and Cultures, *or* SOC 1100, Introduction to Sociology; CHM 1105, General Chemistry for the Health Sciences; BIO 1111, Environment and Man; PHL 1140, Social and Political Philosophy *or* PHL 1135, Philosophical Problems of Law and Justice; *one of the following:* ECN 1250, Statistics 1; MTH 1150, Probability, Statistics, and the Computer; POL 1301, Research Methods 1; ECN 1323, Environmental Economics; POL 1110, Introduction to Politics *or* POL 1112/IAF 1112, Introduction to International Relations; GEO 1140, Environmental Geology *or* GEO 1212, Physical Geology; SOC 1146, Environment and Society; HST 1544, Environmental History of the United States; and Environmental Studies Seminar; Interdisciplinary Environmental Science; Making Environmental Policy; choose eight upper-level environmental studies electives with faculty adviser; independent research, internship *or* field training; experiential education requirement; and capstone/senior thesis.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Environmental Studies Curriculum

Students must complete nine quarter-hours in the prerequisites section; the two interdisciplinary environmental core courses, and the one quarter-hour interdisciplinary seminar.

Geology

Peter S. Rosen, PhD, *Associate Professor and Chair*

Professors
Richard H. Bailey, PhD
Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors
Bernard L. Gordon, MS
Martin E. Ross, PhD

Assistant Professor
Patrick M. Colgan, PhD

Geology is an interdisciplinary science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require coursework in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, geology and land-use planning, environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, to the Grand Canyon, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the co-op plan typically work with local engineering, environmental consulting companies, or with government agencies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation. See pages 164–166 for course descriptions.

Bachelor of Arts in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Geology Curriculum

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; and five geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1100, BIO 1101, Principles of Biology 1 and 2; BIO 1600, BIO 1601, Principles of Biology 1 and 2 Labs; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 *or* BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Environmental Geology Curriculum

GEO 1212, Physical Geology *or* GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning *or* GEO 1442, Water in Environmental Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History

Gerald H. Herman, MA, *Assistant Professor and Acting Chair*

Professors
Ballard C. Campbell, PhD
William M. Fowler, Jr., PhD
Harvey Green, PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Clay McShane, PhD
Anthony N. Penna, DA
Raymond H. Robinson, PhD

Associate Professors
Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD
Christina Gilmartin, PhD

Assistant Professors
Jeffrey Burds, PhD
Adam M. McKeown, PhD
Felix V. Matos Rodriguez, PhD

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers a Bachelor of Arts degree program for students preparing for graduate work in history and/or for teaching careers. It also offers two Bachelor of Science options: one with a minor for students preparing to work in "new history" areas that require technical understanding of the social sciences; and one designed for students preparing for careers in public history. Finally, the department offers a growing array of dual-major programs with other departments, based on the Bachelor of Science, and participates in a variety of interdisciplinary programs, including Women's Studies, Latino/a Studies, Cinema Studies, Environmental Studies, Jewish Studies, and International Affairs.

All history majors are required to take courses in Western or World Civilization, American history, and Historical Methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a Senior Research Seminar, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to do an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through required cooperative education placements, fieldwork, internships, or other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects. See pages 166–172 for course descriptions.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648; *or* HST 1701, Western Civilization 1 (Honors); HST 1122, World Civilization Since 1648 *or* HST 1102, Western Civilization Since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors), and HST 1202, The United States since 1877 *or* HST 1712, The United States Since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Senior Research Seminar; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum with Minor

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization Since 1648; HST 1122, World Civilization Since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201 *or* HST 1711, The United States to 1877 (Honors); and HST 1202, The United States Since 1877 *or* HST 1712, The United States Since 1877 (Honors); HST 1241, The Historian's Craft; HST 1805, Senior Research Seminar; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science with Public History Concentration

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization Since 1648 *or* HST 1122, World Civilization Since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, America to 1877 (Honors) *and* HST 1202, The United States Since 1877 *or* HST 1712, America Since 1877 (Honors); HST 1241, The Historian's Craft; HST 1270, Introduction to Public History; HST 1805, Senior Research Seminar; HST 1821 *and* HST 1822, Fieldwork in History 1 and 2; eight history electives distributed as follows: one course in Group A (ancient, medieval, and early modern); one course in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and two courses in Group E (Public History; these courses, offered in the Graduate School of Arts and Sciences, are open to juniors and seniors only and require faculty permission to enter). One computer course (preferably COM 1105); and a statistics course (for example: PSY 1211, SOC 1320, or ECN 1250).

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1701, Western Civilization 1 (Honors); HST 1102, Western Civilization Since 1648 *or* HST 1122, World Civilization Since 1648 *or* HST 1702, Western Civilization 2 (Honors); HST 1201, The United States to 1877 *or* HST 1711, The United States to 1877 (Honors); HST 1202, The United States Since 1877 *or* HST 1712, The United States Since 1877 (Honors).

Human Services

Maureen Kelleher, PhD, *Director and Associate Professor, Sociology/Anthropology and Human Services*

Advisory Committee

Susan Beaton, MA
Human Service Internship Supervisor

Patricia Fetter, PhD
Counseling Psychology, Rehabilitation, and Special Education

Terry Haywoode, PhD
Education/Human Services

Wilfred E. Holton, PhD
Sociology/Anthropology

Martha Wengert, MEd
Cooperative Education

Harold S. Zamansky, PhD
Psychology

Professors Emeriti

John D. Herzog, PhD

Barbara A. Schram, EdD

Human services is a behavioral sciences major that includes courses in psychology, sociology, education, political science, economics, counseling, and social sciences. Students take basic foundation courses, skills courses, and complete two intensive fieldwork internships in Boston agencies. The major may lead to careers in many diverse areas of the helping professions or to graduate programs in social work, counseling, rehabilitation, education, and law. Students who major in human services select specialization areas such as deaf studies, counseling, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, education, and more. Students prepare for positions in both public and private agencies including: casework in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway

houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, in the Fenway Project, which provides student volunteers to community agencies, and Alpha Delta Omega, the national honor society in human services. See page 132 for course descriptions.

Bachelor of Arts Curriculum

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Human Services and Social Science; ED 1302/HS 1101, The Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1001, Economic Problems and Perspectives *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324/HS 1260, Human Services Research and Evaluation; SOC 1240/HS 1240, Sociology of Human Service Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1309/HS 1219, Intervention Strategies for the Human Services; HS 1333, Senior Seminar in Human Services.

Internship. HS 1336 and HS 1337, Field Internship in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences bachelor of arts core curriculum (see page 33).

Bachelor of Science Curriculum

Prerequisite courses. Same as for the Bachelor of Arts curriculum.

Core courses. Same as for the Bachelor of Arts curriculum plus POL 1329, American Social Welfare Policy *or* SOC 1501, Social Policy and Social Intervention, or another social policy course.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; a six-course specialization in human services, chosen with the student's academic adviser; ED 1107, Beginning Computer Use *or* COM 1105, Computer Science and Its Applications.

In addition, complete the arts and sciences bachelor of science core curriculum (see page 33), plus another mathematics or science course, or a health-related course.

Specialization in Deaf Studies

Prerequisite, core, and internship courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; *or* ASL 1401, American Sign Language Literature.

Major in Human Services Combined with Elementary Education Program

Students can now major in human services and prepare themselves as beginning teachers at the elementary level, meeting the new requirements in Massachusetts. This program gives students a strong background in psychology, sociology, human services, and other fields of study along with skills in teaching. See a human services adviser or the chair of the Department of Education for the requirements of the program in education.

Minor in Human Services Curriculum

ED 1302, Human Services Professions; ED 1309, Intervention Strategies; HS 1336, Internship in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

International Affairs

Advisory Board

John Adams, PhD
Economics

Timothy Donovan, PhD
Associate Dean, Arts and Sciences

T. Anthony Jones, PhD
Sociology and Anthropology

Harry Kuoshu, PhD
Modern Languages

Felix V. Matos Rodriguez, PhD
History

Harlow L. Robinson, PhD
Modern Languages

David E. Schmitt, PhD
Political Science

Denis J. Sullivan, PhD
Political Science

The major in international affairs (BA) provides students with the opportunity to develop a deep understanding of both regional and global issues. It is intended to prepare students for the interdependent world in which they will live, work, compete, and cooperate upon graduation.

Students wishing to complete the major in international affairs will take seventeen courses; in addition, students must fulfill a Foreign Language Proficiency requirement, an International Experience requirement, and the BA Core Curriculum. Students majoring in international affairs should maintain a minimum 2.75 QPA until the beginning of their international experience. Current Northeastern students wishing to declare an international affairs major must have a minimum 2.75 QPA. See pages 173–174 for course descriptions.

Bachelor of Arts Curriculum

Required courses. IAF 1100, Introduction to International Affairs; IAF 1104/SOA 1104, Cultures of the World; IAF 1112/POL 1112, Introduction to International Relations; IAF 1113/POL 1113, Introduction to Foreign Governments; IAF 1122/HST 1122, World Civilization Since 1648; IAF 1300, International Conflict and Negotiation; IAF 1190/ECN 1190, The Global Economy; IAF 1400, International Experience Workshop; and IAF 1500, Senior Seminar in International Affairs.

Foreign Language Proficiency is defined as passing the Intermediate 2 level of a foreign language or meeting a comparable criterion approved by the Department of Modern Languages. (This requirement in the major also parallels the language requirement for the Bachelor of Arts degree in the College of Arts and Sciences.)

International Experience requires that students spend at least one term abroad. Students may fulfill this requirement by choosing at least one of three options: (a) study abroad, through enrollment in a Northeastern University study-abroad program or (with prior approval) through another university; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop individually or which may be sponsored by a major department and/or a Northeastern University study-abroad program; the internship may carry academic credit, with proper approval; (c) international co-op, which may be arranged through the Division of Cooperative Education.

Students must also satisfy requirements for the BA Core Curriculum. (The international affairs major is considered part of the social sciences.)

Elective categories. Students must select a total of eight courses from the dual elective categories of Regional Analysis and Global Dynamics and Development. Four courses must be chosen from each category. Students may choose any four courses from Global Dynamics and Development. Students must choose four courses from Regional Analysis, with at least three from the same subcategory.

Minor Curriculum

Students take seven courses, plus fulfill an International Experience. Foreign language proficiency is not required but strongly recommended, and students are also advised to undertake foreign language study while abroad during fulfillment of their International Experience as appropriate. Northeastern students must have a minimum 2.75 QPA to declare an international affairs minor and must maintain a minimum 2.75 QPA until the completion of their international experience.

IAF 1100, Introduction to International Affairs; IAF 1500, Senior Seminar in International Affairs; five electives chosen from categories of Regional Analysis and Global Dynamics and Development and to be distributed as described (see below). International Experience, fulfilled by choosing one from among four options: (a) study abroad, through enrollment in one of the Northeastern University study-abroad programs, or, with prior approval, through another university; a minimum of one term is required, with two terms encouraged; a maximum of two courses taken as part of study abroad may be counted in fulfilling the number of electives, and these courses must fall within the proper elective categories; (b) internship abroad, which the student may develop or which may be sponsored by a major department or CAS International Study Programs Office; the internship may carry academic credit (with departmental approval); (c) international co-op, arranged through the Division of Cooperative Education; or (d) directed study on campus (when the foregoing are not feasible), to be supervised by faculty specialized in a specific country or region of the student's interest; a minimum of eight credits is required.

A total of five elective courses is required from the dual categories of Regional Analysis and Global Dynamics and Development, as listed below. Students must take at least two courses from each category. Students must select two or three courses from Regional Analysis and these courses must be chosen from at least two different regional subcategories. All electives must be taken from *outside* the student's major.

I Regional Analysis. **Africa:** AFR 1156/MUS 1181, Music of Africa; AFR 1191/HST 1620, Early African Civilization; AFR 1193, Africa Today; AFR 1195, Identity and Nationalism in Africa; AFR 1197/HST 1621, Modern African Civilization; AFR 1342/POL 1342, Crisis and Conflict in Black Africa; AFR 1402/HST 1623, History of West Africa; AFR 1405/HST 1625, South African History.

Asia: HST 1581, American Images of China; HST 1610, Topics in Asian History; HST 1633, Modern China; HST 1634, Contemporary China; HST 1637, Modern Japan; MUS 1183, Music of East Asia; PHL 1250, Chinese Philosophy; PHL 1255, Indian Philosophy; PHL 1275, Eastern Religions; PHL 1293, Eastern Philosophy; POL 1332, Government and Politics of Japan; POL 1371, Government and Politics of China; SOC 1104, Sociology of Japan.

Europe: ART 1204, Renaissance Architecture; ART 1205, Renaissance Art; ECN 1333, European Economic Development; ENG 1652, Twentieth-Century English Literature; HST 1301, Topics in European History; HST 1390, Population in European History; HST 1473, Women in Modern Europe; HST 1481, The Culture of Europe; INT 1321, Modernism; LNF 1521, French Film and Society; LNG 1554, Modern German Film and Literature; LNS 1500, Backgrounds of Spanish Culture; LNS 1550, Spanish Civil War in Spanish Film; POL 1306, Politics in Western Europe; POL 1340, Crisis and Change in Central/Eastern Europe; POL 1343, Politics and Violence in Northern Ireland; POL 1347, Russian Politics After Communism; SOC 1105, Society and Culture in Russia and the Former Soviet Union.

Latin America: AFR 1196, The Black Experience in the Caribbean; HST 1537, Latin America and the Caribbean in Boston; HST 1538, History of Latinos (-as) in the United States; HST 1604, Modern Latin America; HST 1605, The Modern Caribbean; INT 1121, Introduction to Latino, Latin American, and Caribbean Studies; LNS 1501, Backgrounds of Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of South America, Latin America, and the Caribbean; POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development.

Middle East: HST 1612, The Modern Middle East; HST 1613, The Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; MUS 1182, Music of the Middle East; PHL 1285, Introduction to Jewish Religion and Culture; POL 1345, Government and Politics in the Middle East; POL 1346, Gender in the Middle East.

II Global Dynamics and Development. AFR 1294, Third World Political Relations; ECN 1150, Economics of World Energy and Primary Resources; ECN 1190/IAF 1190, The Global Economy; ECN 1335, International Economics: Finance; ECN 1336, International Economics: Trade; HST 1644, Third World Women; HST 1652, Islam Resurgent; INB 1338, Introduction to International Business; INB 1735, Import and Export Management; PHL 1130, Ethics: East and West; PHL 1137, Philosophical Problems of War and Peace; PHL 1280, Islam; POL 1309, International Political Economy; POL 1338, Religion and Politics; POL 1355, Ethnic Conflict; POL 1369, Political Violence; POL 1384, Arab-Israeli Conflict; POL 1386, International Law; POL 1411, Seminar in International Relations; SOA 1120, Camera on Culture; SOA 1310, Global Markets and Local Cultures; SOC 1171, Race and Ethnic Relations: A World Perspective.

Journalism

Nicholas Daniloff, MA, *Professor and Director*

Associate Professors	Assistant Professors	Lecturer
Charles F. Fountain, MS	Belle Adler, MJ	Gladys McKie, MA
William Kirtz, MS	Laurel Leff, MA	
James Ross, MS	Alan Schroeder, MPA	

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end, the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies. See pages 174–176 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1105, Computer-Assisted Reporting; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1501, History of Journalism; JRN 1508, Law of

the Press; and JRN 1512, Journalism Ethics and Issues, a capstone course that fulfills the experiential education learning requirement.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Reporting; JRN 1440, Design and Graphics; a beat reporting class; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1423, Documentary Production; and one journalism elective.

Additional requirements. ENG 1110, ENG 1111, College Writing 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one additional English or American literature elective; and one political science course. HST 1201, United States to 1877; HST 1202, United States Since 1877; ECN 1001, Economic Problems and Perspectives; and one business management course; MTH 1152, Statistical Thinking; one philosophy course; one history elective; and COP 1135, Professional Development for Journalists; MUS 1109, Introduction to Art, Drama, and Music.

Additional requirements for bachelor of arts. One course in science.

Additional requirements for bachelor of science. Two foreign language courses (at least up to Elementary II level) and four science or computer science courses. Two of the four science courses must be in biology, chemistry, and physics, and at least one of the science courses must be above the elementary level.

Students must also complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

The minor in journalism is designed to provide students with basic journalism skills in research, observation, and interviewing, and to offer an overview of the ethical, legal, and historical role of journalism in society. It helps prepare students for careers in reporting and editing, both in print and broadcast journalism, and provides some of the background necessary for careers in advertising and public relations. The minor includes eight courses, all within the School of Journalism.

Required courses: JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues. Choose one from the following: JRN 1305, Techniques of Journalism; JRN 1320, Radio News Gathering and Reporting, JRN 1336, Public Relations Principles; JRN 1350, Advertising Principles; and JRN 1421, Television Newswriting *or* another writing course approved by the director of the School of Journalism.

Linguistics

Janet H. Randall, PhD, *Associate Professor and Coordinator of Linguistics Program*

Professors
Irene R. Fairley, PhD
English
Harlan Lane, PhD,
Doc. ès Lettres
Psychology
Joanne L. Miller, PhD
Psychology

Associate Professors
John N. Frampton, PhD
Mathematics
Michael R. Lipton, PhD
Philosophy and Religion

Assistant Professors
John D. Coley, PhD
Psychology
Neal Pearlmutter, PhD
Psychology
Fei Xu, PhD
Psychology

Lecturers
Benjamin Fortson, PhD
Linguistics
Heather Littlefield, MA
Linguistics
Barbara Skarabelova, MA
Linguistics

Linguistics is the scientific study of human language. A growing and exciting field, it has links to diverse fields including cognitive psychology, philosophy, neuroscience, computer science, artificial intelligence, sociology, language teaching, anthropology, and education. Linguistics is a key component of the emerging field of cognitive science, the study of the structure and functioning of human cognitive processes.

How do children learn to speak? How is language represented in the mind? What do all languages, including sign languages, have in common? How is language different from the communication systems used by whales, bees, and chimpanzees? What do we need to program into a computer in order

to converse with it? How might we think about linguistic controversies, including debates about official languages, Ebonics, gender bias, and bilingualism in education? Linguistics attempts to answer each of these questions and covers a surprisingly broad range of topics related to language and communication.

The courses in the linguistics program come from seven departments (African-American Studies, American Sign Language, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology/Anthropology). Each course is cross-listed under LIN and its other departmental prefix, and can be used interchangeably in the two areas. Many linguistics courses can be taken for credit in the honors program.

Linguistics offers a variety of co-ops, including positions at local companies involved in speech recognition and production, as well as in Northeastern's own speech perception and language processing labs. Linguistics majors can also participate in a special foreign internship opportunity, doing research at the Max Planck Institute for Psycholinguistics in the Netherlands.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special education, and robotics. See pages 176–178 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

LIN 1118, Introduction to Language and Linguistics 1; LIN 1215, Symbolic Logic (LIN/PHL 1200 and 1203, Introduction to Logic 1 and 2 may be substituted.); LIN 1218, Introduction to Language and Linguistics 2; LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; LIN 1335, Language and Culture; and LIN 1401, Introduction to Syntax.

Second language requirement. Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a second language.

Additional courses. Four from the following (and other related courses by permission): LIN 1119, History of the English Language; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1263; Nonverbal Communication; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499, Psychology of Reading; LIN 1564, Laboratory in Cognition; and LIN 1804, Directed Study.

Lab course. LIN 1562, Laboratory in Psycholinguistics.

Seminar courses. Two from the following: LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics, and LIN 1693, Seminar in Linguistics.

Experiential education practicum course (in fieldwork, interpreting, teaching, etc.). LIN 1888, Experiential Education Directed Study.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

A total of six courses is required. LIN 1118, Introduction to Language and Linguistics 1; and LIN 1218, Introduction to Language and Linguistics 2.

Plus one from the following: LIN 1220, Introduction to Phonetics and Phonology; LIN 1262, Psychology of Language; and LIN 1401, Introduction to Syntax.

Three courses, not already taken, from the following: LIN 1119, History of the English Language; LIN 1215, Symbolic Logic; LIN 1220, Introduction to Phonetics and Phonology; LIN 1231, African-American English; LIN 1235, Applied Linguistics; LIN 1236, Advanced Applied Linguistics; LIN 1240, Bilingualism; LIN 1245, History of the French Language; LIN 1250, Linguistics of American Sign Language; LIN 1255, History of the Spanish Language; LIN 1260, Introduction to Romance Linguistics; LIN 1262, Psychology of Language; LIN 1263, Nonverbal Communication; LIN 1335, Language and Culture; LIN 1362, Child Language; LIN 1364, Cognition; LIN 1365, Language and the Brain; LIN 1401, Introduction to Syntax; LIN 1407, Semantics; LIN 1408, Topics in Linguistics; LIN 1415, African Languages; LIN 1440, Philosophy of Language; LIN 1499, Psychology of Reading; LIN 1562, Laboratory in Psycholinguistics; LIN 1564, Laboratory in Cognition; LIN 1661, Seminar in Psycholinguistics; LIN 1662, Seminar in Cognition; LIN 1692, Seminar in Linguistics; LIN 1693, Seminar in Linguistics; and LIN 1804, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors
Samuel J. Blank, PhD
Bohumil Cenkl, ScD
Stanley J. Eigen, PhD
Terence J. Gaffney, PhD
Maurice E. Gilmore, PhD
Arshag B. Hajian, PhD
Anthony Iarrobino, PhD
Venkatrama Lakshmibai, PhD
Marc N. Levine, PhD
Mikhail Malioutov, PhD
Egon Schulte, PhD
Jayant M. Shah, PhD
Mikhail Shubin, PhD
Gabriel Stolzenberg, PhD
Chuu-Lian Terng, PhD
Jerzy M. Weyman, PhD
Andrei V. Zelevinsky, PhD

Associate Professors
Mark Bridger, PhD
Robert W. Case, PhD
John N. Frampton, PhD
Eugene H. Gover, PhD
Samuel Gutmann, PhD
Solomon M. Jekel, PhD
Christopher K. King, PhD
Donald R. King, PhD
Nishan Krikorian, PhD
N. V. R. Mahadev, PhD
Alex Martsinkovsky, PhD
David Massey, PhD
Robert C. McOwen, PhD
Mark B. Ramras, PhD
Martin Schwarz, PhD
Thomas O. Sherman, PhD
Alexandru I. Suciu, PhD
Gordana G. Todorov, PhD

Assistant Professor
Aidong Adam Ding, PhD

Clinical Assistant Professor of Mathematical Practice
Carla B. Oblas, MS

Lecturers
Robert A. Lupi, MS
Peter J. Philliou, MS
Steven W. Olson, ME

Professors Emeriti
Holland C. Filgo, PhD
Alberto R. Galmarino, PhD
Jack Warga, PhD

Mathematics is of ever-increasing importance to our society and everyday life. It has long been the language of science and technology, and provides a rich source of methods for analyzing and solving problems encountered in the physical world. Today, however, mathematics is essential in virtually all fields of human endeavor, including business, the arts, and the social sciences.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology, and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" at Northeastern that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry. See pages 178–182 for course descriptions.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1170, Mathematical Discovery and Computers; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Students may satisfy the arts and sciences experiential education requirement by taking MTH 1360, Seminar in Applied Mathematics, or through student teaching; this applies only to students graduating after the year 2000.

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1170, Mathematical Discovery and Computers; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 33).

Students may satisfy the arts and sciences experiential education requirement by taking MTH 1360, Seminar in Applied Mathematics, or through student teaching; this applies only to students graduating in the year 2000.

Note: The Department of Mathematics anticipates making changes to the requirements for the mathematics major. Consult an adviser regarding these changes.

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser: (a) two must be selected from MTH 1200 or higher courses, e.g., MTH 1225, MTH 1226, MTH 1230, *or* MTH 1384 (these two courses may be required by the student's major program); (b) the other two must be selected from MTH 1301–1399 and may *not* be among those required by the student's major program (MTH 1384 cannot be counted by many engineering majors and MTH 1301 cannot be counted by computer science majors; MTH 1301 cannot be counted at all if MTH 1230 is already counted in "a," above).

Modern Languages

Harlow L. Robinson, PhD, *Professor and Chair*

Professors
Inez Hedges, PhD
Constance H. Rose, PhD
Stephen A. Sadow, PhD

Associate Professors
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Bonnie S. McSorley, PhD
Holbrook C. Robinson, PhD
John Spiegel, PhD

Assistant Professors
Harry Kuoshu, PhD
Robert B. Modee, MA
Rei Okamoto, PhD

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Russian. It is possible to minor in Italian, Russian, or German. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas. See pages 182–191 for course descriptions.

Bachelor of Arts in French Curriculum

LNF 1201, Intensive Review of French, LNF 1202, LNF 1203, and LNF 1204, French Composition Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French-Speaking World; LNF 1309, LNF 1310, French Literature of the Nineteenth Century 1 and 2; LNF 1311, 1312, French Literature of the Twentieth Century 1 and 2; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

Bachelor of Arts in Spanish Curriculum

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture *or* LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th-Century Literature 1 and 2; LNS 1311, LNS 1312, 20th-Century Literature 1 and 2;

LNS 1315, Latin American Literature 1; LNS 1505, Cervantes and His Times; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil War in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

Bruce Ronkin, DMA, *Associate Professor and Chair*

Professors
Joshua R. Jacobson, DMA
Judith Tick, PhD

Associate Professors
Leonard L. Brown, PhD
William Lowe, MA
Dennis H. Miller, DMA
David D. Sonnenschein, DMA

Assistant Professors
Susan Asai, PhD
Anthony P. DeRitis, PhD
Leon C. Janikian, MM

Lecturers
Marjorie J. Atlas, MM
Paul Beaudoin, MM
William Carman, BA
Douglas F. Durant, PhD
Virginia Eskin, BA
Allen G. Feinstein, MM
David Herlihy, JD
Eric Jackson
John Mallia, MM
Robert Lyons, BS
Martha Peabody, MA
Shawn Radley, BS
Andrew J. Rega, BM
Peter Spellman, MA
Robert Ward, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study. The department offers four concentrations in the context of a broad liberal arts program.

The music literature and performance concentration combines history with hands-on music making. This concentration leads to a Bachelor of Arts degree and an audition is required. The music literature concentration has an historical orientation and leads to a Bachelor of Arts degree.

The music technology concentration teaches students to compose music using the newest electronic music technology, both hardware and software. Students learn techniques such as MIDI sequencing, digital and analog recording, sound design, audio for video, and the latest methods for delivering music over the Internet. Students also study composition for both acoustic and electric instruments. The concentration includes a thorough background in the fundamentals of music, including music theory and history, and leads to a Bachelor of Science degree.

The Music Teacher Preparation Program is offered in coordination with the New England Conservatory of Music. This program leads to a Bachelor of Arts degree and to provisional Massachusetts teaching certification. An audition is required for this concentration.

The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in fields such as artist management, the music products industry, the record industry, art administration, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles. See pages 191–197 for course descriptions.

Bachelor of Arts Curriculum

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1241, Piano 1; MUS 1301, MUS 1302, Form and Analysis 1 and 2; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1211, Sight-Singing; MUS 1241, Piano 1; MUS 1261, Applied Music Lessons (every quarter except when enrolled in MUS 1270, Middler Recital, and MUS 1271, Senior Recital); MUS 1301 and 1302, Form and Analysis 1 and 2; MUS 1421, MUS 1422, MUS 1423, MUS 1424, and MUS 1425, Historical Traditions 1, 2, 3, 4, and 5; MUS 1370, Seminar in Performance Practice. Also take HST 1102, Western Civilization 2, and three music electives chosen in consultation with adviser.

Students preparing for the Massachusetts Music Teaching Provisional Certification have to add the following courses: ED 1306, Measurement and Evaluation; ED 1412, Fundamentals of Curriculum Development; (NEC) Music Education Orientation; (NEC) ED 413, Teaching Choral Music; (NEC) ED 417, Teaching Instrumental Music; (NEC) ED 332, Teaching Classroom Music II; (NEC) ED 533, Philosophy of Music Education; (NEC) ED 461, Practice Teaching Seminar; and (NEC) ED 463, Practice Teaching.

Students in both concentrations must participate in at least one Northeastern University performing ensemble every quarter.

In addition, complete the arts and sciences core curriculum (see page 33).

Music teacher preparation program. The Music Department at Northeastern University and the New England Conservatory of Music have launched a coordinated Music Teacher Preparation Program. This comprehensive program, designed to meet the new Massachusetts state certification requirements, will prepare students for the music teaching profession. In accordance with the new state certification requirements, music teachers must earn a BA in music for provisional certification and a master's degree for standard certification. This new undergraduate program is a synthesis of Northeastern University's existing Music Literature and Performance major and a battery of New England Conservatory of Music Education courses as well as practice teaching (practicum). This program leads to a Northeastern University BA degree in music with Massachusetts teacher certification (recognized by most states). Because enrollments are limited, the program should be considered to be competitive. For additional information and audition requirements for the BA in music, contact: Professor David Sonnenschein, Music Department, 351 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115.

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2, and 3; MUS 1171, Computer Literacy for Musicians; MUS 1421 and MUS 1425, Historical Traditions 1 and 5; any two of the following: MUS 1422, MUS 1423, MUS 1424, Historical Traditions 2, 3, and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry. Choose five music industry electives from: MUS 1167, Music Administration; MUS 1172, Introduction to Music Recording; MUS 1173, Music Recording 2; MUS 1174, Music Production for Radio; MUS 1175, Music and Technology 2; MUS 1360, Artist Management; MUS 1361, The Record Industry; MUS 1362, Music Merchandising; MUS 1366, Copyright Law for Musicians; MUS 1367, Computer Applications in Music Business; ECN 1181, Economics of Art and Culture. Additional electives are planned.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and ECN 1260; POL 1301 and 1302, Research Methods 1 and 2; MGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Entrepreneurship *or* other adviser-approved business courses; HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least four of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in music technology. Five quarters of private lessons in music composition; COM 1100, Fundamentals of Computer Science; MUS 1201, MUS 1202, and MUS 1203, Music Theory 1, 2, and 3; MUS 1171, Computer Literacy for Musicians; MUS 1241, Piano Class 1; MUS 1421, MUS 1425, Historical Traditions 1 and 5; MUS 1172, Introduction to Music Recording; MUS 1173, Music Recording 2; MUS 1175, Music and Technology 2; Sound Design; Digital Audio Advanced Music Systems; MUS 1205, Music Composition; Composition for Electronic Instruments 1 and 2; MUS 1176, History of Electronic Music; Interactive Electronic Music Performance; MUS 1301, Form and Analysis 1; select two from the following: MUS 1422, MUS 1423, 1424, Historical Traditions 2, 3, and 4. Electives: Select any three from the following music technology electives: ART 1171, Animation Basics; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; MUS 1165, MUS 1166, The Music Industry 1 and 2; MUS 1174, Music Production for Radio; MUS 1367, Computer Applications in Music Business; and Scripting for Interactivity. Students must participate in at least one Northeastern University performing ensemble during at least four quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 33).

Dual major in multimedia studies. The multimedia studies dual major (Departments of Music and Art and Architecture) will combine coursework in the student's primary discipline with courses outside their own field. For their capstone courses, students will work in cross-disciplinary teams developing and delivering original multimedia content. The concentration that is required for students pursuing multimedia studies from the music program is music and technology.

Dual major in multimedia studies with music technology concentration. Music technology students accepted into the dual major in multimedia studies will take all required courses in the music technology concentration *except* for MUS 1205, Music Composition; and Interactive Electronic Music Performance. In addition, students must take six Art and Architecture requirements: ART 1130, Visual Studies Foundation; ART 1132, Principles of Graphics; ART 1160, Introduction to Photography; ART 1170, Animation Basics; ART 1180, Video Basics; and ART 1190, Introduction to Computer Graphics; and eight extra-disciplinary requirements: CMN 1451, Foundations of Broadcast Technology; HST 1494, History and Film *or* HST 1495, Technological Transformations of Society; HST 1575, History of Media in America; and LNF 1551, Film Theory. Law and Multimedia; Multimedia Projects 1 and 2. Requirements are subject to change, please see the Music Technology adviser.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; INT 1110, American Musical Theatre; MUS 1107, Principles of Music; MUS 1421, Historical Traditions 1: American Music; any two music electives; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Michael Lipton, PhD, *Associate Professor and Chair*

Professor
Stephen L. Nathanson, PhD

Associate Professors
William J. DeAngelis, PhD
Gordon E. Pruett, PhD
Susan M. Setta, PhD

Assistant Professor
Patricia Illingworth, JD, PhD

Lecturers
Margaret C. Huff
Michael C. Meyer, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine, through critical reflection, their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities. The department offers three ways to major in philosophy: the standard major, the concentration in law and ethics, and the concentration in religious studies. See pages 197–200 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

The standard major offers the maximum number of electives to enable students to follow their own interests. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; one of the following four: PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one seminar; and eight philosophy electives (to be selected after consultation with the student's adviser) to bring the total number of quarter hours in philosophy to fifty-two.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following four: PHL 1435, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; PHL 1335, Moral Philosophy; and three philosophy electives.

Concentration in law and ethics. Designed for the philosophy major seeking a career in law, the concentration focuses on the areas of law, social and political philosophy, and applied ethics. The concentration structures the electives so that the student's major serves both the fields of philosophy and those traditionally considered pre-law. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; one of the following four: PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one philosophy seminar; and three electives drawn from the following: PHL 1130, Ethics: East and West; PHL 1135, Philosophical Problems of Law and Justice; PHL 1140, Social and Political Philosophy; PHL 1165, Moral Problems in Medicine; PHL 1170, Business Ethics; three law-related courses to be chosen in consultation with the student's adviser and drawn from social science departments; and three philosophy electives to bring the total number of quarter hours in the major to fifty-two.

Concentration in religious studies. Designed for philosophy majors seeking a career in religious studies, this concentration focuses on providing competency in comparative religion, textual analysis, and methodology. Through the concentration in religious studies, the students will understand the basic theologies, practices, and ethical systems of several of the world's larger faith traditions. PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1225, Ancient Philosophy; PHL 1230, Modern Philosophy; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; PHL 1435, Philosophy of Mind; at least one seminar; PHL 1290, Cults and Sects *or* PHL 1345, Philosophy of Religion; three of the following: PHL 1100, Introduction to Religion: PHL 1275, Eastern Religions; PHL 1280, Islam; PHL 1315, Understanding the Bible; and five philosophy and religion electives to bring the total number of quarter hours in the major to fifty-two.

Physics

Paul M. Champion, PhD, *Professor and Chair*

Matthews Distinguished University Professors
Jorge V. José, PhD
Pran Nath, PhD
Stephen Reucroft, PhD
Fa-Yueh Wu, PhD

College of Arts and Sciences Distinguished Professors
Alain S. Karma, PhD
Srinivas Sridhar, PhD

Professors
Ronald Aaron, PhD
Arun Bansil, PhD
Alan H. Cromer, PhD
David A. Garelick, PhD
Haim Goldberg, PhD
Donald E. Heiman, PhD
Robert S. Markiewicz, PhD
Clive H. Perry, PhD
Carl A. Shiffman, PhD
Jeffrey B. Sokoloff, PhD
Yogendra N. Srivastava, PhD
Michael T. Vaughn, PhD
Eberhard von Goeler, PhD
Allan Widom, PhD

Associate Professors
George O. Alverson, PhD
Marie E. Machacek, PhD
Tomasz Taylor, PhD

Assistant Professors
Nathan Israeloff, PhD
Sergey Kravchenko, PhD
J. Timothy Sage, PhD
John D. Swain, PhD
Darien Wood, PhD

Professors Emeriti
Petros N. Argyres, PhD
William L. Faissler, PhD
Marvin H. Friedman, PhD
Michael J. Glaubman, PhD
Walter Hauser, PhD
Bertram J. Malenka, PhD
Eugene J. Saletan, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields. See pages 200–203 for course descriptions.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5, and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1300, Computer Physics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; PHY 1415, Quantum Mechanics 1; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, MTH 1243, MTH 1244, Calculus for Science Majors 1, 2, 3, 4, and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional science electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

Christopher J. Bosso, PhD, *Associate Professor and Chair*

Professors
Michael A. Baer, PhD
Robert E. Gilbert, PhD
Minton F. Goldman, PhD
Ronald D. Hedlund, PhD
Eileen L. McDonagh, PhD
William F. S. Miles, PhD
Suzanne P. Ogden, PhD
David A. Rochefort, PhD

Matthews University Distinguished Professor
Robert L. Cord, PhD

Distinguished Professor
Michael S. Dukakis, JD

Edward Brooke Professor
David E. Schmitt, PhD

Thomas P. O'Neill Chair in Public Life
William Crotty, PhD

Russell B. and Andrée B. Stearns Trustee Professor of Political Economy
Barry Bluestone, PhD

Associate Professors
L. Gerald Bursey, PhD
William D. Kay, PhD
William G. Mayer, PhD
John H. Portz, PhD
Denis J. Sullivan, PhD
Michael C. Tolley, PhD

Assistant Professors
Amilcar A. Barreto, Jr., PhD
Bruce A. Wallin, PhD

Political science majors study the art and science of politics, the structure and functions of government, political behavior, and public policy making. Political science is interdisciplinary by nature, so students will learn about the political and policy dimensions of societies, economic systems, and cultures, today and across time, both in the United States and in other nations.

Political science majors can choose from a wide array of courses in American politics, international relations, comparative politics, public administration, and political theory. Majors can follow a general studies path, selecting from among electives as they go along, or they can pursue more structured and more specialized concentrations in law and legal issues, international and comparative politics, or public policy and administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Many students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as Project Vote Smart, the Model United Nations, the Model Arab League, the student government, or the College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations. See pages 203–207 for course descriptions.

Bachelor of Arts Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and eight political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; six law and legal issues electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; POL 1260, Public Policy; six public policy and administration electives; and one general political science elective.

Concentration in international relations and comparative politics. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112/IAF 1112, Introduction to International Relations; POL 1113/IAF 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); experiential education requirement; and six international relations and comparative politics electives; and two general political science electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; six law and legal issues electives; and one general political science elective.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in public policy and administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301, POL 1302, Research Methods 1 and 2; experiential education requirement; POL 1260, Public Policy; and six public policy and administration electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 33).

Concentration in international relations and comparative politics. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112/IAF 1112, Introduction to International Relations; POL 1113/IAF 1113, Introduction to Foreign Governments; POL 1261, Public Administration; one political theory course (POL 1373, Pre-Modern Political Thought; POL 1374, Modern Political Thought; *or* POL 1378, Contemporary Political Thought); POL 1301 and POL 1302, Research Methods 1 and 2; experiential education requirement; six international relations and comparative politics electives; and one general political science elective.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

Stephen G. Harkins, PhD, *Professor and Chair*

Matthews Distinguished University Professors
Harlan Lane, PhD
Doc. ès Lettres
Joanne L. Miller, PhD

College of Arts and Sciences Distinguished Professors
Judith A. Hall, PhD
Joanne L. Miller, PhD

Professors
Harry A. Mackay, PhD
Adam J. Reeves, PhD
Harold S. Zamansky, PhD

Associate Professors
Martin L. Block, PhD
Perrin S. Cohen, PhD
Rhea T. Eskew, PhD
Franklin Naarendorp, PhD

Assistant Professors
Elizabeth Cole, PhD
John D. Coley, PhD
C. Randall Colvin, PhD
Denise Jackson, PhD
Richard H. Melloni Jr., PhD
Neal Pearlmutter, PhD
Fei Xu, PhD

Psychology is the science of behavior and mental processes. Using studies of animals and humans, psychologists seek to explain and develop ways to manage the behaviors and mental life of the individual.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine. See pages 207–211 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language; PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs *or* two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2.

Two courses from the following: PSY 1241, Developmental Psychology 1; PSY 1271, Social Psychology; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1. Three courses from the following: PSY 1231, Learning and Motivation; PSY 1262, Psychology of Language; PSY 1351, Psychobiology; PSY 1364, Cognition; and PSY 1381, Sensation *or* PSY 1382, Perception.

Four psychology electives.

Sociology and Anthropology

T. Anthony Jones, PhD, *Associate Professor and Chair*

Matthews Distinguished University Professors
Debra R. Kaufman, PhD
Elliott A. Krause, PhD

Brudnick Professor
Jack Levin, PhD

Russell B. and Andrée B. Stearns Trustee Professor of Political Economy
Barry Bluestone, PhD

Professors
Arnold Arluke, PhD
Winifred Breines, PhD
Michael E. Brown, PhD
Alan M. Klein, PhD
Thomas H. Koenig, PhD
Earl Rubington, PhD
Thomas M. Shapiro, PhD
Lynn Stephen, PhD

Associate Professors
Luis M. Falcon, PhD
Wilfred E. Holton, PhD
Maureen Kelleher, PhD
Judith Perrolle, PhD
Gordana Rabrenovic, PhD

Assistant Professor
Daniel R. Faber, PhD
Matthew O. Hunt, PhD

Professors Emeriti
Carol A. Owen, PhD
Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research. See pages 212–214 for sociology course descriptions and pages 136–137 for anthropology course descriptions.

Bachelor of Arts in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level) in sociology; two advanced courses (1300, 1400, or 1500 level) in sociology; and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level) in sociology; two advanced courses (1300, 1400, or 1500 level) in sociology; and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Sociology Curriculum

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300-, 1400-, or 1500-level course in sociology.

Bachelor of Arts in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Introduction to Archaeology; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 33).

Bachelor of Science in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Introduction to Archaeology; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 33).

Minor in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Janet Bobcean, MFA, *Associate Professor and Acting Chair*

Professor
Edward Bullins, MFA

Associate Professors
Nancy Kindelan, PhD
Del Lewis, MFA
Jerrold A. Phillips, PhD

Clinical Lecturer
Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—at Northeastern University balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education. See pages 215–217 for course descriptions.

Bachelor of Arts and Bachelor of Science Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1206, THE 1207, Technical Theatre 1 and 2; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; THE 1370, Rehearsal and Performance (general); THE 1370 Rehearsal and Performance (experiential education requirement); and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4.

All theatre majors should select the following courses in their *freshman* year: (fall quarter) THE 1100, Introduction to Theatre Arts and THE 1206, Technical Theatre 1; (winter quarter) THE 1150, Acting 1 (majors section) and THE 1207, Technical Theatre 2; (spring quarter) THE 1800, Practicum in Production 1.

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1370, Rehearsal and Performance (general); two tech/design courses; two performance courses; and two history/literature/criticism courses.

Concentration in production. THE 1208, Technical Theatre 3; THE 1209, Theatrical Drafting; THE 1370, Rehearsal and Performance (production area); two tech/design courses; and two history/literature/criticism courses.

Concentration in performance. THE 1155, Voice for the Theatre; THE 1160, Movement 1; THE 1301, THE 1302, Acting 3 and 4; THE 1370, Rehearsal and Performance (performance area); and two history/literature/criticism courses.

Committed electives. All majors: ART 1101, History of Art Since 1400, should become a committed elective for all majors; ENG 1658, Introduction to Shakespeare, should be taken by majors to fulfill a category III core curriculum requirement. Performance concentration majors must take 4 quarter hours of dance, gymnastics, or fencing.

All students must complete the arts and sciences core curriculum (see page 33).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (winter quarter); THE 1206, THE 1207, Technical Theatre 1 and 2; THE 1300, Acting 2; THE 1370, Rehearsal and Performance (general); and THE 1800, THE 1801, Practicum in Production 1 and 2. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Music majors who wish to minor in musical theatre must take the following courses: THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section) (winter quarter); THE 1160, Movement 1; THE 1300, Acting 2; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Health Sciences

Patrick F. Plunkett, EdD, *Dean*
Carole A. Shea, PhD, RN, FAAN, *Associate Dean for Academic Affairs*
Ena Vazquez-Nuttall, EdD, *Associate Dean and Director of the Graduate School*
Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*
Anne M. Sullivan, MEd, *Director of the Office of Student Services*
William J. Purnell, *Director of Graduate Admissions*
Nancy P. Warner, MS, *Academic Counselor*
Kristen D. Hoag, *Academic Counselor*
Esther B. Williams, *Freshman Counselor*
Carol M. Konis, *Assistant Director of Operations*
Margaret K. Schnabel, *Assistant Graduate Director*
Barry Kass, MBA, *Director of Continuing Education and Development*

The programs in Bouvé College of Health Sciences* combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated allied health professionals, nurses, and pharmacists. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

There are three schools within the Bouvé College of Health Sciences: the School of Health Professions, the School of Nursing, and the School of Pharmacy. The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care, including a pharmacy externship-internship period and clinical affiliations in nursing, physical therapy, and other health professions; a cooperative education work program; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the Association of Schools of Allied Health Professions, the American Association of Colleges of Nursing, and the American Association of Colleges of Pharmacy.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate, unless otherwise specified by a program.

Sophomore	1.8
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX); and a C or better in professional courses (ATP, NUR, PMD, and PTH). A required course in which a D, F, or W (withdrawal from course) grade is received can be repeated only once. Other standards for progress are published in the *Bouvé College of Health Sciences Undergraduate Student Handbook* available in the College Student Services Office in 113 Mugar.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Nursing special requirements. A grade of C or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1162, BIO 1163, and BIO 1164. The QPA for these science courses must be 2.0 before a student can enter the sophomore year.

*Effective *January 1, 1999*, the Bouvé College of Pharmacy and Health Sciences and the College of Nursing *merged to become the Bouvé College of Health Sciences.*

Doctor of Pharmacy Class of 2003–04 special requirements. For the Class of 2003–04, a grade of C (2.0) or better must be earned in all courses in the Doctor of Pharmacy program. Students who are administratively released after three quarters in The English Language Center will not be allowed to continue in the Pharmacy Program.

Deficiencies will be cumulative such that a student is warned with two deficiencies, placed on probation with three deficiencies, and dropped from the pharmacy program when the fourth deficiency is earned, *even if previous deficiencies have been remediated.* A student who fails a required course twice will be dropped from the Doctor of Pharmacy Program.

All coursework in the first and second years of the curriculum must be completed satisfactorily in order for a student to progress to the middler year of the curriculum.

Students with a QPA equal to, or greater than, 2.5 will be able to progress to middler-year standing pending satisfactory completion of all academic and co-op requirements stated herein. Students with QPA below 2.5 but above 2.0, will be warned at the end of the freshman year. Students who fail to achieve the required 2.5 QPA with no deficiencies at the end of the sophomore year will not be allowed to continue in the Doctor of Pharmacy Program.

Students who receive an I (incomplete grade) must file an "Incomplete Clearance Form" with the Student Service Office within three weeks from the date the I is posted. That clearance form must show that the course can be made up some time within the first six weeks of the following quarter. Failure to clear the I grade within the allotted time will result in the course being counted as a deficiency for purposes of progression.

In addition to academic performance, satisfactorily evaluated co-op experience will be required for normal progression. Students who fail to obtain an available co-op position or who receive an unsatisfactory grade will be allowed one opportunity, over a two-quarter time period, to remediate. Students who cannot meet this requirement will be blocked from future registration in the Doctor of Pharmacy Program.

In years three through six, a student must pass every course in a quarter with a grade of C or better in order to progress to the next quarter. A student who fails to achieve the minimum satisfactory grade will be expected to wait until the failed course is offered again and repeat the course at that time. In the interim, a student may petition to be on co-op or on leave of absence. Students who withdraw from a course (or courses) are also considered deficient for the purpose of progression.

Required experiential rotations are considered courses, and the rules stated above apply to them as well. Repeat of a failed rotation is scheduled by the appropriate coordinator and is done on a space-available basis.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, a student must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, a student must have a minimum quality-point average of 2.0 and have earned a C– or better in all professional courses. To enter clinical studies in the junior and senior years, a student must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, nursing, pharmacy, or physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

School of Health Professions

Mary E. Watson, EdD, RRT, *Interim Dean of the School and Associate Dean of the College*

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year athletic training program is designed for students who are interested in an allied health-care profession specializing in the health care of athletes. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, evaluation, management, treatment, and rehabilitation of athletic injuries. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year and must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students are required to fulfill their clinical education requirements during academic quarters with athletic teams in approved settings at Northeastern University or other colleges, universities, and high schools in the Boston area.

The program is in the process of seeking accreditation by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. See page 256 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1105, General Chemistry for the Health Sciences 1; ENG 1110, College Writing 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1652, Integrated Human Anatomy and Physiology 2 Lab; CHM 1106, General Chemistry for the Health Sciences 2; and ENG 1111, College Writing 2.
Quarter 3	ATP 1050, Emergency Care of Athletic Injuries; BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; COM 1105, Computer Science and Its Applications; COP 1360, Co-op Education in Athletic Training; and SOC 1100, Introduction to Sociology.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; PSY 1111, Foundations of Psychology 1; and one elective.
Quarter 5	ATP 1200, Clinical Athletic Training; ATP 1250, Evaluation of the Head and Spine; PHY 1202, Physics for the Life Sciences 2; and PTH 1310, Clinical Gross Anatomy.
Quarter 6	ATP 1300, Lower Extremity Evaluation; ATP 1390, Athletic Training Practicum 1; CPS 1611, Kinesiology; CRS 1510, Health Counseling; and Middler-Year Writing Requirement.
Quarter 7	ATP 1350, Upper Extremity Evaluation; ATP 1360, Applied Neuroscience; ATP 1450, Soft-Tissue Massage and Joint Mobilization; and HSL 1286, Nutrition.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1410, Disease and Disabilities in Athletes; ATP 1490, Athletic Training Practicum 2; and CPS 1615, Exercise Physiology 1.
Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; PSY 1112, Foundations of Psychology 2; and one elective.

Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; CPS 1408, Research Design; SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

William J. Gillespie, EdD, *Associate Professor and Acting Chair*

Associate Professors
Thomas A. Barnes, EdD, RRT
Marilyn A. Cairns, ScD
Patrick F. Plunkett, EdD, RRT
Mary E. Watson, EdD, RRT

Assistant Professor
Joseph R. Libonati, PhD

Assistant Clinical Specialists
Joseph A. Curro, MBA, RRT
Eric B. Pepin, EdD, CCP
Annemarie Sullivan, MS

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in exercise physiology or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization. See pages 257–259 for course descriptions.

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapists are instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar, and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the recognition Registered Respiratory Therapist (RRT). The program is accredited by the Commission on Accreditation of Allied Health Education Programs.

Bachelor of Science in Cardiopulmonary Science Curriculum

Quarter 1	CHM 1105, General Chemistry 1; COM 1105, Computer Science and Its Applications, CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, College Writing 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1142, Basic Animal Biology 1; BIO 1642, Basic Animal Biology 1 Lab; CHM 1106, General Chemistry 2; CPS 1112, Cardiopulmonary Sciences Seminar 2; NUR 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; CPS 1115, Basic Life Support and Cardiac Assessment; ENG 1111, College Writing 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

Exercise Physiology Curriculum

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1 and 2; Research Design; Health Science Education; Electrocardiography; Pharmacology; Clinical Practicum 1 and 2; Clinical Seminar; Administrative Rehabilitation Programs; and electives.

Respiratory Therapy Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences 3; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Health Science Education; Introduction to Respiratory Care; Professional Practice Laboratories; Clinical Seminars; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2, and 3; Respiratory Care for the Medical and Surgical Patient; Respiratory Care for Critical Patients; Neonatal and Pediatric Respiratory Care; Advanced Cardiac Life Support; and electives.

Medical Laboratory Science

Barbara E. Martin, MHP, MT(ASCP), CLS(NCA), *Director and Senior Clinical Specialist*

Associate Professors
Judith T. Barr, ScD, CLS(NCA)
Britta L. Karlsson, MS, MT(ASCP), CLS(NCA)

Lecturers
Tenin Aburto, PhD, MT(ASCP)
Ellen Goonan, BS, MT(ASCP)
David G. Grenache, PhD, MT(ASCP)
Ram Rammohan, MS, MT(ASCP)
Frances Sullivan, BA, MT(ASCP)
Elizabeth Szymczak, MS, MT(ASCP)

Assistant Clinical Specialist
Rose Marie Salah, MS, MT(ASCP) Sc

Snell Visiting Professor
Mary Louise Turgeon, EdD, MT(ASCP), CLS(NCA)

Laboratory Coordinator
Judith Baronas, BS, MT(ASCP)

Teaching Assistant
Anthony Baran, BS, MT(ASCP)

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological, chemical, and medical research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper-class students have the opportunity for international placements. Recently students have had co-ops in Sweden and the United Kingdom. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care

facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate-degree coursework toward subsequent studies for the baccalaureate degree. See pages 264–265 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; CHM 1111, General Chemistry 1; ENG 1110, College Writing 1; MLS 1101, MLS Orientation 1; and MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; MLS 1102, MLS Orientation 2; MLS 1104, Laboratory Techniques; PHY 1201, Physics 1; PHY 1501, Physics 1 Laboratory (optional); and one elective.
Quarter 3	CHM 1122, General Chemistry 2; ENG 1111, College Writing 2; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Laboratory; PHY 1202, Physics 2; and PHY 1502, Physics 2 Laboratory.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1125, Hematology; MLS 1225, Hematology Laboratory; PAH 1202, Anatomy-Physiology 1; and one elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1172, Basic Immunology; PAH 1204, Anatomy-Physiology 2; and one or two electives.
Quarter 6	BIO 1282, Genetics; BIO 1660, Genetics Lab; CHM 1221, Analytical Chemistry; MLS 1145, Microbiology; MLS 1245, Microbiology Laboratory; and MLS 1672, Immunopathology.
Quarter 7	BIO 1283, Introductory Biochemistry; BIO 1661, Introductory Biochemistry Lab; ENG 1380, Writing for the Health Professions; MLS 1648, Advanced Microbiology; MLS 1649, Parasitology and Mycology; and one elective (optional).
Quarter 8	MLS 1132, Immunohematology; MLS 1152, Clinical Chemistry; MLS 1232, Immunohematology Laboratory; MLS 1621, Advanced Hematology 1; MLS 1661, MLS Education; and one elective (optional).
Quarter 9	MLS 1252, Clinical Chemistry and Instrumentation Laboratory; MLS 1623, Special Topics in Hemostasis; MLS 1631, Advanced Immunohematology; MLS 1656, Advanced Clinical Chemistry; one elective and one optional elective.
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1573, Immunology 1 MT Applied Study 2; and MLS 1665, Management.
Quarter 11	MLS 1533, Immunohematology MT Applied Study; MLS 1552, MT Clinical Chemistry Applied Study; and MLS 1574, Immunology 2 MT Applied Study.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of Medical Laboratory Science: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor and a baccalaureate degree, the student may be eligible for categorical national certification examination based on relevant work experience or completion of clinical applied studies. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry, who need organic chemistry.

Post-Baccalaureate Certificate Program

The post-baccalaureate certificate program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, clinical chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a categorical area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

Physical Therapy

Meredith H. Harris, EdD, PT, *Associate Professor and Chair*
Ann Noonan, EdD, PT, *Associate Professor and Associate Chair*

Associate Professors
Robert Sikes, PhD
Chad A. Starkey, PhD, *Program Director, Athletic Training*

Assistant Professors
Lorna Hayward, EdD, PT
Timothy Hilliard, PhD
Maura D. Iversen, ScD, PT
Judith Schaechter, PhD, MS, PT
Christine R. Wilson, PhD, PT

Associate Clinical Specialist
Cindy I. Buchanan, PhD, PT

Assistant Clinical Specialists
Joseph Cigna, PhD, PT
Marie B. Corkery, MS, PT
Xristos Gaglias, MS, AT
Ann Golub-Victor, MPH, PT, PCS
Mary J. Hickey, BS, PT, OCS
Sonya L. Larrieux, MA, PT
Susan Lowe, BS, MS, PT
Sheri L. Martin, MS, PT, AT
Mary O'Brien, MPH, PT
Jamie Paz, MS, PT
Susan Polich, MEd
Donnalee Shain, MS, PT, PCS
Nancy H. Sharby, MS, PT
Susan H. Ventura, MEd, PT
Maryann Wilmarth, MS, PT, OCS

Entry-Level MSPT Program

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery. The first five years of this curriculum result in a Bachelor of Science degree in rehabilitation science. The program in physical therapy culminates at the end of six years in an entry-level Master of Science degree in physical therapy.

Physical therapists provide services to patients and clients who have impairments, functional limitation, disabilities, or changes in physical function resulting from injury, disease, or other causes. In addition, physical therapists are involved in wellness initiatives, including screenings, health promotions, and educational activities that provide preventive care to forestall or prevent functional decline and/or to eliminate the need for costlier forms of care. They perform administrative duties and direct and supervise support personnel. Physical therapists interact and practice in collaboration with a variety of health-care professionals, including physicians, dentists, nurses, educators, social workers, occupational therapists, speech language pathologists, and audiologists.

Physical therapists function in a variety of settings, including community and university hospitals; rehabilitation centers; private practices; educational settings; extended care facilities; freestanding outpatient clinics; home health agencies; and community, state, and federal agencies.

Through a commitment to excellence in teaching, research, and service, the Department of Physical Therapy develops individuals who are clinically competent, independent thinking, health-care professionals. The program incorporates the University's Academic Common Experience objectives and encourages the development of communication skills, critical and creative thinking, information literacy, and interpersonal skills. It also emphasizes the importance of developing historical, ethical, aesthetic, and personal perspectives, and of understanding the contexts provided by natural, social, and cultural worlds (including a multicultural understanding). In the classroom, students develop problem-solving skills, manual dexterity, and proficiency in technique and with equipment.

Physical therapy students alternate quarters of academic study with quarters of cooperative education work experience. Students may be employed as physical therapy co-op students with increasing responsibilities commensurate with their academic studies, or they may perform other health-related preprofessional duties. These experiences provide an opportunity for the application and reinforcement of the lessons of the classroom and laboratory. Prior to graduation, students have 18 months of related work experience.

Changes in health care are occurring at a rapid pace. New demands placed on students and educators require a broad team approach and multidisciplinary focus. Cross-training in health and rehabilitation areas such as physical therapy, speech and language pathology, nursing, pharmacy, and counseling is highly valued by potential employers. The cooperative education and the professional programs in health encourage students to obtain Certified Nursing Assistant (CNA) credentials so they are prepared for cross-training experiences early in their cooperative education experiences. We believe that these experiences will later enrich their discipline-specific training.

In addition to cooperative education, the program includes three eight-week affiliations that are mandated by the American Physical Therapy Association. Clinical affiliations allow the student to practice clinical skills under the supervision of a licensed physical therapist. Clinical sites across the United States, offering a wide range of specialties, participate in our clinical education program. Every effort is made to match students to sites that suit academic need and geographic convenience; however, students should be prepared to travel out of state for a minimum of one affiliation. Availability of a car is also required, as most sites are not accessible by public transportation. All expenses associated with clinical affiliations, including travel and housing, are the responsibility of

the student. A very small number of sites offer student incentives including stipends, meals, and housing at low or no cost to the student, but this is becoming increasingly rare.

Students are accepted into the program as freshmen and do not need to reapply. During the freshman year, students take a course in basic physical therapy procedures, so they not only begin to study their major immediately but also are prepared for their cooperative education experience. To continue in the program, students must maintain acceptable standards of scholarship and academic performance as outlined in the student handbook. Students must develop appropriate motor skills, professional behavior, and emotional maturity. Students may be required to purchase a laboratory kit in the freshman year that they will use throughout the curriculum.

The program in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Graduates of the Master of Science in Physical Therapy (MSPT) program are eligible to sit for the Physical Therapy Licensure Examination. See pages 274–276 for course descriptions.

Bachelor of Science in Rehabilitation Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1105, Chemistry for Health Sciences 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus.
Quarter 1 or 2	PTH 1001, Basic Physical Therapy Procedures.
Quarter 2	BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1653, Integrated Human Anatomy and Physiology 2 Lab; CHM 1106, Chemistry for Health Sciences 2; and ENG 1110, College Writing 1.
Quarter 3	BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; ENG 1111, College Writing 2; and PSY 1111, Foundations of Psychology 1.
Quarter 1, 2, or 3	COM 1105, Computer Science and Its Applications; PTH 1001, Basic Physical Therapy Procedures; and designated electives.*
Quarter 4	CPS 1615, Exercise Physiology 1 with lab; PTH 1252, Clinical Gross Anatomy 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics for the Life Sciences 1 Lab; and PSY 1112, Foundations of Psychology 2.
Quarter 5	PTH 1253, Clinical Gross Anatomy 2; PHY 1202, Physics for the Life Sciences 2; PTH 1203, Therapeutic Modalities in Physical Therapy Practice; PTH 1320, Soft Tissue Mobilization; and one multicultural elective.
Quarter 6	PTH 1316, Neuromuscular Physiology; PTH 1325, Clinical Medicine 1; PTH 1330, Clinical Kinesiology; and PTH 1352, Psychosocial Aspects of Illness.
Quarter 7	PHP 1300, Pharmacotherapeutics for Physical Therapy Practice; PTH 1340, Pathokinesiology; PTH 1345, Orthopedic Clinical Medicine 2; and PTH 1366, Neuroanatomy.
Quarter 8	ENG 1340, Writing Workshop; PTH 1118, Developmental Basis of Human Performance; PTH 1391, Cardiopulmonary Rehabilitation in Physical Therapy; and PTH 1440, Musculoskeletal Evaluation and Treatment 1.
Quarter 9	MTH 1150, Probability, Statistics, and the Computer; PTH 1363, Neurological Evaluation and Treatment 1; and PTH 1441, Musculoskeletal Evaluation and Treatment 2.
Quarter 10	PTH 1364, Neurological Evaluation and Treatment 2; PTH 1405, Research for Physical Therapy; PTH 1426, Functional Aspects of Aging; and PTH 1430, Physical Therapy for the Pediatric Client.
Graduate Year	
Quarter 11	PTH 1400, Administration; PTH 1411, Clinical Integration; and PTH 3345, Communications and Health Promotion in Physical Therapy.
Quarter 12	PTH 1420, Physical Therapy in the Health-Care System.
Quarter 13	CPS 1632, Health Science Education; and PHL 3265, Issues in Medical Ethics.

Additional Professional and Required Courses

Graduate courses: Clinical Integration 2 and 3, and Research for Physical Therapy 2.

Note: This curriculum is subject to revision.

*Designated electives: Students must take one course in three of the following areas: sociology/anthropology, fine arts, and history/political science.

Speech-Language Pathology and Audiology

Kevin P. Kearns, PhD, *Associate Professor and Chair*

Professors
Arlene Greenstein, PhD
Mary Florentine, PhD

Associate Professors
Linda Ferrier, PhD
Sharon Y. Manuel, PhD
Robert Redden, EdD

Assistant Professor
Therese O'Neil Pirozzi, ScD
Ralf W. Schlosser, PhD

Clinical Specialists
Helen Anis, MA
Denise J. Frankoff, MA
Mary Beth Lannon, EdD
Marjorie North, MA

Speech-language pathologists and audiologists are involved with the evaluation and treatment of, and counseling and research in human communication and its disorders. The speech-language pathology and audiology program is designed to help students develop entry-level competencies that will enable them to function in a preprofessional capacity in educational settings, medical and rehabilitation centers, and private practice clinics. Students will be exposed to a wide variety of communication disorders through observations and participation in activities at the Northeastern University Speech and Hearing Center. Externship in schools, hospitals, or other relevant settings will also broaden students' exposure and prepare them for graduate study or employment.

Speech-language pathologists and audiologists provide clinical services to a full range of communicatively impaired individuals, from infants through geriatrics. Speech-language pathologists treat disorders such as developmental language and articulation disorders, voice and resonance problems, stuttering, and language and cognitive impairments due to stroke, head injury, and progressive neurologic diseases. Audiologists specialize in the prevention, identification, assessment, and rehabilitation of hearing disorders. Individuals with congenital and acquired hearing impairments are seen for services by audiologists. They prescribe and dispense hearing aids and instruct individuals in the use of amplification. Undergraduate students take courses in both speech-language pathology and audiology in preparation for advanced training and specialization at the graduate level.

The bachelor of science degree program in speech-language pathology and audiology includes an experiential learning component, a broad-based academic core, and the scientific and clinical coursework necessary for understanding normal and disordered communication. The degree offers preprofessional training for individuals who want to pursue graduate education in speech-language pathology and audiology. Alternately, graduates may be hired as speech and hearing assistants in a variety of clinical settings, or they may pursue other career paths in health care and education.

The speech-language pathology and audiology curriculum is designed to facilitate critical thinking, information literacy, and oral and written communication skills. In addition to coursework in the basic communication sciences, coursework is required in special needs/education, allied health, computer literacy, ethics, multicultural/diversity issues, and psychology. The curriculum provides a solid foundation in speech-language pathology and audiology and arts and sciences, and it is sufficiently flexible to provide students with the opportunity to minor in an area of related interest.

A unique aspect of the program is an accelerated graduate provision for students who qualify at the end of year three. Students who have maintained a QPA of 3.25 or better, who have a departmental endorsement, and who have satisfied all graduate program admissions requirements may seek admission to Northeastern University's graduate program in speech-language pathology and audiology. In effect, students who enter the accelerated master's degree track will complete the bachelor of science requirements within the framework of our graduate program. They will be eligible for the master of science and bachelor of science degrees and meet national certification requirements at the end of their fifth year of matriculation. The accelerated track is selective and a restricted number of students are admitted each year. The graduate programs in speech-language pathology and audiology and the University's Speech and Hearing Center are fully accredited by the American Speech-Language-Hearing Association. See page 276 for course descriptions.

Class Entrance Requirements

Students in speech-language pathology and audiology are required to obtain a grade of C or better in professional courses. A required course in which a grade below C or a grade of W is received can be repeated only once.

Special Requirements

During the first two years, speech-language pathology and audiology students must achieve a grade of C or better in each of the prerequisite sciences, as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the middler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the speech-language pathology and audiology program and department.

	Quarter 1	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; ENG 1110, College Writing 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; and SLA 1101, Introduction to Speech and Hearing.
	Quarter 2	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; COM 1105, Computer Science and Its Applications; ENG 1111, College Writing 2; and PSY 1111, Foundations of Psychology 1.
	Quarter 3	MTH 1150, Probability, Statistics and the Computer; PSY 1112, Foundations of Psychology 2; PSY 1231, Learning and Motivation 1; and NUR 1282, Wellness or health science elective.
	Quarter 4	SLA 1201, Anatomy and Physiology of Vocal Mechanisms; SLA 1300, Language Acquisition; and two electives.
	Quarter 5	PHL 1165, Moral Problems in Medicine or ethics elective; SOC 1160, Gender in a Changing Society *or* multicultural/diversity elective; SLA 1301, Phonetics; one elective; and co-op orientation (1 QH).
	Quarter 6	CMN 1330, Interpersonal Communication 1 *or* communication elective; SLA 1200, Hearing Science; SLA 1400, Speech Science; and one elective.
	Quarter 7 (Summer)	Co-op
	Quarter 8 (Fall)	Co-op
	Quarter 9	ENG 1380, Writing for the Health Professions; PSY 1262, Psychology of Language *or* psychology elective; SLA 1410, Speech-Language Pathology; and SLA 1460, Neurological Bases of Communication.
	Quarter 10	SLA 1303, Introduction to Audiology; SOC 1217, Women, Health, and Social Change *or* diversity/multicultural elective; SLA 1411, Speech Pathology 2; and one elective.
	Quarter 11	PSY 1364, Cognition *or* psychology elective; SLA 1403, Clinical Procedures, Speech; Clinical Procedures, Audiology, *or* elective; PSY 1364, Cognition *or* psychology elective; and Seminar in Speech-Language Pathology and Audiology.
Graduate Year	**Quarter 12**	ED 1311, Case Management: Diagnosis and Treatment *or* ED/CRS elective; SLA 3629, Aural Rehabilitation; SLA elective; and one open elective.
	Quarter 13	Co-op in speech-language pathology and audiology.
	Quarter 14	SLA seminar in speech-language pathology and audiology (with co-op component); SLA 3660, Early Intervention *or* SLA elective; and two electives.

School of Nursing

Eileen H. Zungolo, MEd, EdD, RN, FAAN, *Dean of the School and Associate Dean of the College*
Lea A. Johnson, MS, MSN, RN, *Assistant Dean of Administration*
TBA, *Assistant Dean of Student Affairs*
TBA, *Director of Graduate Programs*

Professors
Patricia Maguire Meservey, MS, PhD, RN
Carole A. Shea, MS, PhD, RN, FAAN

Associate Professors
Jane F. Aroian, MSN, EdD, RN
Lynn Babington, MSN, PhD, RN
Michelle A. Beauchesne, MS, DNSc, RN, PNP
Olivia M. Breton, MEd, RN
Margery M. Chisholm, MS, EdD, RN, CS
Mary Anne Gauthier, MSN, EdD, RN
Carol Glod, MS, PhD, RN, CS
Patricia J. Hollen, MS, PhD, RN
Dorett Hope, MSEd, EdD
Elizabeth M. Howard, MS, PhD, RN, ANP
Barbara R. Kelley, MS, MPH, EdD, RN, PNP
M. Marcia Lynch, MSN, DNSc, RN
Peggy S. Matteson, MS, PhD, RN
Carol A. Patsdaughter, MSN, PhD, RN
Susan J. Roberts, MS, DNSc, RN, ANP
Mary Suzanne Tarmina, MS, PhD, RN, FNP
Mary E. Wilcox, MS, RN
M. Delaine Williamson, MS, MPH, RD
Rachel Zachariah, MS, DNSc, RN

Assistant Professors
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Rhonda M. Board, MS, PhD, CCRN
Margaret H. Christensen, PhD, RN
Rosanna DeMarco, MS, PhD, RN
Margaret A. Mahoney, MS, PhD, RN
Joan A. Masters, MS, PhD, RN, CS
Kathleen Miller, MS, EdD, RN, ANP
Abraham N. Ndiwane, MS, EdD, RN

Associate Clinical Specialists
Cynthia L. Dakin, MSN, RN
Martha E. Griffin, MSN, RN
Ann M. Kennedy, MS, RN
Patricia A. Kiladis, MS, RN
Carolyn O'Brien, MS, RN, ANP
Pamela Whitting, MS, RN

The School of Nursing offers a Bachelor of Science in Nursing program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, community health centers, schools, and homes. The school aims to provide all students—including those with diverse backgrounds and changing career goals—with a broad-based education that will foster ongoing personal and professional growth.

Nursing is both a science-based process and a caring art. The curriculum offers instruction in the sciences with opportunities in the humanities. Since nursing practice focuses on promoting, preserving, and restoring the health and well-being of individuals, families, groups, and communities across the life span, the curriculum emphasizes a community-based primary care approach, which starts in the freshman year and builds throughout the program. This approach requires knowledge, skills, and attitudes related to health care that are comprehensive, culturally sensitive, continuous, effective, compassionate, and collaborative. Because the vast majority of people's lives are spent in the community, a significant part of the clinical program takes place in the community where people live, work, eat, rest, play, vote, and pray. Recognizing the equally important need to prepare nurses to care for ill patients in institutions, the program provides ample opportunities for nursing practice in hospitals, rehabilitation centers, and long-term care facilities. The curriculum is capped by courses that enable students to put leadership and management skills into action, and to synthesize the complete role of the professional nurse in a clinical practicum.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives them the opportunity to integrate the theory and practice of nursing in selected settings. Through more than seventy community and institutional health-care agencies in Greater Boston and across the country, students gain experience in providing nursing care to a variety of patients and families. Students learn that nurses have major roles in wellness and health promotion, acute care, and long-term care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and the Commission on Collegiate Nursing Education and is approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The school subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member. See pages 266–267 for course descriptions.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titer and immunization for measles, mumps, rubella, and tetanus. Hepatitis B, PPD, and a chicken pox titer are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the School of Nursing are required to wear the approved school uniform in some clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the clinical courses must have access to a car to travel to assigned agencies and are responsible for their own transportation costs.

Graduation Requirements

The School of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. The faculty has designed a curriculum to prepare nursing students for health-care practice that addresses common goals to improve our nation's health. Degree candidates must complete all prescribed courses, a minimum of 177 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the program are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the School of Nursing. Degree requirements and the year of graduation for a student who does not make academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The School of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 60 quarter hours of transfer credits that are appropriate to curriculum requirements. These credits must include two anatomy and physiology courses (with labs) and one chemistry course (with lab) and reflect a minimum overall QPA of 2.5. A microbiology course (with lab) is strongly recommended. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of two quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and six months.

RN to BSN Option

The School accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree into the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through the development of a portfolio to validate prior learning. The RN to BSN curriculum option has been revised to reflect the need for community-based primary-care learning experiences with emphasis on management and leadership. Students entering the program in fall 1999 will participate in course offerings and program requirements that are designed to increase flexibility and facilitate learning for working nurses.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Anatomy and Physiology 1; BIO 1652, Anatomy and Physiology 1 Lab; CHM 1107, Basic Chemistry for the Nursing Professional; ENG 1110, College Writing 1; and MTH 1101, Applications of Algebra.
Quarter 2	BIO 1163, Integrated Anatomy and Physiology 2; BIO 1653, Anatomy and Physiology 2 Lab; COM 1105, Computer Science and Its Applications; COP 1370, Introduction to Nursing Career Management; ENG 1111, College Writing 2; and NUR 1110, Nursing Health Assessment.
Quarter 3	BIO 1164, Integrated Anatomy and Physiology 3; BIO 1654, Anatomy and Physiology 3 Lab; PSY 1111, Foundations of Psychology 1; NUR 1102, Introduction to Human Nutrition; NUR 1107, Nursing Process and Skills.
Quarter 4	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; NUR 1206, Promoting Healthy Childbearing and Childrearing; and NUR 1307, Influences of Health and Illness.
Quarter 5	NUR 1202, Pathophysiological Concepts for Clinical Nursing; NUR 1208, Promoting Healthy Adulthood and Aging; and PCL 1305, Pharmacodynamics 1.
Quarter 6	ENG 1350, Writing for the Professions; PCL 1307, Pharmacodynamics 2; PHL 1165, Moral Problems in Medicine; and SOC 1100, Introduction to Sociology.
Quarter 7	NUR 1308, Promoting Health Restoration in Adults; and one humanities elective.
Quarter 8	NUR 1306, Promoting Health Restoration in Children; one history elective; and one free elective.

Quarter 9	NUR 1408, Promoting Mental Health Restoration; SOC 1320, Introduction to Statistical Analysis; and one elective.
Quarter 10	NUR 1406, Promoting Healthy Communities; NUR 1502, Introduction to Research in Nursing; and one elective.
Quarter 11	ECN 1130, Health Care and Medical Economics; NUR 1507, Comprehensive Nursing Practicum; and NUR 1508, Managing and Leading in Nursing.

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Independent Study; Health-Care Informatics; and Wellness.

School of Pharmacy

Judith T. Barr, ScD, *Interim Dean of the School and Associate Dean of the College*

Department of Pharmaceutical Sciences

Vladimir P. Torchilin, PhD, DSc, *Professor and Chair*

Professors
Mehdi Boroujerdi, PhD
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Robert Hanson, PhD
Ban An Khaw, PhD

Associate Professors
Mansoor Amiji, PhD
Norman R. Boisse, PhD
Jonathan Freedman, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Barbara L. Waszczak, PhD

Assistant Professors
Eric J. Mack, PhD
Jiang Zheng, PhD

Lecturer
Eugene A. Bernstein, PhD

Department of Pharmacy Practice

Samuel J. Matthews, PharmD, *Associate Professor and Interim Chair*

Professor
Gerald E. Schumacher, PharmD, PhD

Associate Professors
Judith T. Barr, ScD
Robert J. Cersosimo, PharmD

Assistant Professors
Kristin C. Oberg, PharmD
Shirley M. Tsunoda, PharmD

Assistant Clinical Specialists
Todd A. Brown, BS
Maureen C. Lloy, PharmD
Debra C. Mahfouz, PharmD
Molly S. Mortimer, PharmD
Jennifer M. Sickels, PharmD
Steven G. Terra, PharmD

Pharmacists promote the safe use of drugs by providing pharmacy care. The expanding role of the pharmacist as a clinical drug consultant to physicians, nurses, health-care professionals, and patients has broadened the scope of professional opportunities. Pharmacists prepare and dispense the drugs prescribed by physicians. The roles of clinical drug expert and drug dispensing have given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in management, research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate schools.

The school offers three options for pharmacy education. These curricula offer a blend of academic classroom and co-operative education experiences. The entry-level, co-operative education, six-year Doctor of Pharmacy program opened for entering freshmen in the fall of 1997. In addition, students who entered the Bachelor of Science in Pharmacy program in the fall of 1996 or before may apply for the six-year Doctor of Pharmacy Tracking Option after successful completion of the Bachelor of Science curriculum through quarter 9.

In order to be eligible for any pharmacy degree, a student must have satisfactorily completed all prescribed courses in his or her curriculum, have an overall 2.0 quality-point average (QPA), and must meet the co-operative education, clerkship, externship, and other requirements as stated in the *Bouvé College of Health Sciences Student Handbook* for his or her degree and year of graduation. These undergraduate programs subscribe to the standards established by the American Council of Pharmaceutical Education (ACPE) and the American Association of College of Pharmacy, and all are ACPE-accredited.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited school of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

The profession of pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community phar-

macy offers the opportunity to combine specialized pharmaceutical training with skills in management, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, health systems, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical companies, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, management, or law. See pages 268–274 for course descriptions.

Doctor of Pharmacy Curriculum (Class of 2003)

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; ENG 1110, College Writing 1; PMD 1100, Introduction to the Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry for the Life Sciences 1; COM 1105, Computer Science and Its Applications; COP 1350, Pharmacy Co-op Seminar 1; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Basic Calculus 2; PMD 1102, Introduction to Pharmacy Practice; and one directed elective.*
Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, General Chemistry for the Life Sciences 2B; ENG 1111, College Writing 2; MTH 1108, Basic Calculus 2 *or* two directed electives.
Quarter 4	CHM 1264, Organic Chemistry for Biology Science Majors 1; PHY 1201, Physics for the Life Sciences 1; one directed elective*; and one open elective*.
Quarter 5	CHM 1265, Organic Chemistry for Biology Science Majors 2; PHY 1203, Physics for the Life Sciences 3; one directed elective*; and one open elective*.

*Directed electives: Students must choose one elective in psychology (PSY) and one elective in economics (ECN) and one multicultural diversity elective from an approved course list available in the Student Service Office, 113 Mugar. Open electives may be chosen from any arts and sciences category, from business (for nonbusiness majors), or from computer science. Restrictions and prerequisites placed by other colleges must be honored.

Additional Professional and Required Courses

Year 3 (3 quarters of coursework and one Co-op)	Biochemistry; Human Physiology 1 and 2; Human Physiology Laboratory; Human Anatomy; Pathophysiology 1 and 2; Health Care Systems; Immunology; Communication Skills for Pharmacy Practice; Medical Microbiology and Antimicrobials; Pharmaceutical Calculations; Dosage Forms; and Pharmacy Care 1.
Year 4 (2 quarters of coursework and two Co-ops)	Physical Pharmacy; Pharmaceutics Laboratory; Pharmacology 1, 2, and 3; Principles of Chemistry; Pharmacy Management 1 and 2; Nonprescription Medicine; Integrated Science and Therapeutics 1 and 2; Therapeutic Drug Monitoring and Patient Applications; Pharmacy Care 1 and 2; and two professional elective modules.
Year 5 (3 quarters of coursework and one Co-op)	Integrated Science and Therapeutics 3–8; Research Methods and Biostatistics; Pharmacy Care 3; Decision Sciences in Pharmacy; Clinical Toxicology Module; Jurisprudence; Pharmacy Ethics; Practice Laboratory 2; and four professional elective modules.
Year 6	Three quarters of required and elective Pharmacy Experiential Clerkship rotations designed to meet Doctor of Pharmacy requirements.

Bachelor of Science with Doctor of Pharmacy Tracking Option (Class of 1999–2001)

Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics *or* MTH 1107, Functions and Basic Calculus; PHP 1102, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; ENG 1110, College Writing 1; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health-Care Delivery.
Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, College Writing 2; MTH 1108, Calculus or an open elective; and one arts and sciences elective.

Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry 1; PCT 1240, Pharmaceutical Calculations *or* PAH 1202, Anatomy and Physiology 1; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology 1 *or* PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
Quarter 6	PCT 1300, Dosage Forms; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1453, Experimental Design in Pharmacology; PCT 1340, Physical Pharmacy; and PCT 1370, Pharmaceutics Laboratory.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
	Students admitted in the fall of 1996 or before must satisfactorily complete the curriculum above through quarter 9. During the winter quarter of their junior year, students must elect to complete the Bachelor of Science program or may apply for admission to the Doctor of Pharmacy Tracking Option. Applicants for the track must have a good academic record showing an overall quality-point average (QPA) of 2.75 or better, and must complete an application that includes a personal goals statement and letters of recommendation from faculty and co-op employers. Acceptance to the track is made on a space-available basis.

Bachelor of Science Option

Fifth Year (Bachelor of Science)

Quarter 10 (Summer/ Winter)	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1302, Pharmacy Administration 1; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Doctor of Pharmacy Tracking Option

For students who entered as freshmen in the fall of 1996 and before (Bachelor of Science class of 2001, 2000, and 1999, who have been, or may be, admitted as tracking students for the PharmD classes of 2002, 2001, 2000, and 1999) and for students transferring to the classes of 2000 and 2001 who may be eligible for the track.

Fifth Year (PharmD)

Quarter 10 (Summer)	Co-op
Quarter 11 (Fall)	PHP 1615, Clinical Immunology; PMD 1501, Advanced Pathophysiology/Pharmacotherapeutics 1 (formerly PAH 3214); TOX 1300, Clinical Toxicology; and one professional elective.
Quarter 12 (Winter)	PHP 1314, Pharmacy Care Management; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Laboratory; PMD 1502, Advanced Pathophysiology/Pharmacotherapeutics 2 (formerly PAH 3215); PMD 1511, Pharmacy Research and Evaluation (formerly MHP 3201); PMD 1512, Biometrics (formerly PAH 3201).
Quarter 13 (Spring)	PHP 1302, Pharmacy Administration 1; PMD 1503, Advanced Pathophysiology/Pharmacotherapeutics 3 (formerly PAH 3216); PMD 1515, Pharmacoeconomics; and one professional elective.

Sixth Year (Summer–Spring)	PharmD
Quarter 14	PMD 1605, Clinical Clerkship 1; PMD 1606, Clinical Clerkship 2.
Quarter 15	PMD 1607, Clinical Clerkship 3; PMD 1608, Clinical Clerkship 4.
Quarter 16	PMD 1609, Clinical Clerkship 5; PMD 1610, Clinical Clerkship 6.
Quarter 17	PMD 1611, Clinical Clerkship 7; PMD 1612, Clinical Clerkship 8.

A student must successfully complete each section of the Advanced Pathophysiology/Pharmacotherapeutics sequence in order to progress to the next section (PMD 1501, PMD 1502, PMD 1503) and to the Clerkship portion of the curriculum. Each Clerkship must be completed with a grade of C or better.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the workforce or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies. See pages 276–277 for course descriptions.

Bachelor of Science Curriculum

Class of 2000 and 2001

Quarter 1	BIO 1108, General Biology 1; BIO 1608, General Biology Lab; ENG 1110, College Writing 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, College Writing 2; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.
Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology; and one professional elective.
Quarter 9	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1813, Toxicology Research *or* one professional elective.

	Quarter 10	CHM 1432, Instrumental Analysis *or* CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1811, Toxicology Research; and one arts and sciences elective.
	Quarter 11	MLS 4341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; TOX 1813, Toxicology Research; and one or two arts and sciences electives.
Class of 2002 and thereafter	Quarter 1	BIO 1108, General Biology; BIO 1608, General Biology Lab; COM 1105, Computer Science and Its Applications; COP, Co-op Seminar; ENG 1110, College Writing 1; MTH 1106, Functions and Algebra *or* MTH 1107, Functions and Basic Calculus; and TOX 1100, Toxicology Orientation.
	Quarter 2	CHM 1111, General Chemistry for the Life Sciences 1; ENG 1111, College Writing 2; MTH 1107, Functions and Basic Calculus *or* MTH 1108, Basic Calculus 2; and PHY 1201, Physics for the Life Sciences 1.
	Quarter 3	BIO 1109, Animal Biology; BIO 1609, Animal Biology Lab; CHM 1122, General Chemistry for the Life Sciences 2B; MTH 1108, Basic Calculus 2 *or* arts and sciences elective; and one arts and sciences elective.
	Quarter 4	CHM 1264, Organic Chemistry for Biology Science Majors 1; PAH 1202, Anatomy-Physiology 1; PSY 1211, Statistics in Behavioral Science 1; TOX 1101, Current Topics in Toxicology; and one arts and sciences elective.
	Quarter 5	CHM 1265, Organic Chemistry for Biology Science Majors 2; PAH 1204, Anatomy-Physiology 2; PHY 1203, Physics for the Life Sciences 3; and one arts and sciences elective.
	Quarter 6	PMD 1300, Biochemistry; PMD 1402, Pharmacology 1; TOX 1811, Toxicology Research *or* elective; and one arts and sciences elective.
	Quarter 7	ENG 1350, Writing for the Professions; PMD 1413, Pharmacology 2; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
	Quarter 8	MHP 3200, Fundamental Risk Assessment; PMD 1310, Immunology; PMD 1311, Pathophysiology 1; and TOX 1301, Fundamental Principles of Systemic Toxicology.
	Quarter 9	PMD 1320, Medical Microbiology and Antimicrobials; PMD 1321, Pathophysiology 2; PMD 1414, Pharmacy Seminar 2; and TOX 1300, Clinical Toxicology.
	Quarter 10	PMD 1404, Research Methods and Biostatistics; TOX 1322, Biochemical Toxicology Laboratory; one arts and sciences elective; and one professional elective.
	Quarter 11	MLS 1601, Foundations of Forensic Laboratory Science; TOX 1302, Chemical and Analytical Toxicology; and one professional elective.

Forsyth School for Dental Hygienists

Linda Hanlon, RDH, BS, MEd, *Dean*
Robyn Olson, RDH, BS, *MPA*, *Assistant Dean*
Judith S. Harvey, CDA, BA, MEd, *Director of Admissions*

The Forsyth School for Dental Hygienists conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. The dental hygienist is the "preventive oral health professional licensed in dental hygiene, who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health." In other words, the dental hygienist is that member of the oral health team who is responsible for the preventive aspects of dental treatment.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the United States Department of Education.

Application should be made directly to the Forsyth School for Dental Hygienists, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalog, write that office or call 617.262.5200, extension 211, 212, or 213, FAX 617.262.4021. See pages 260–262 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	BIO 1162, Integrated Human Anatomy and Physiology 1; BIO 1652, Integrated Human Anatomy and Physiology 1 Lab; CHM 1107, Basic Chemistry for the Nursing Professional; ENG 1110, College Writing 1; and MTH 1101, Applications of Algebra.
Quarter 2	BIO 1163, Integrated Human Anatomy and Physiology 2; BIO 1653, Integrated Human Anatomy and Physiology 2 Lab; DHY 1101, Dental Hygiene Orientation 1; ENG 1111, College Writing 2; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1164, Integrated Human Anatomy and Physiology 3; BIO 1654, Integrated Human Anatomy and Physiology 3 Lab; DHY 1102, Dental Hygiene Orientation 2; PSY 1111, Foundations of Psychology 1; and one elective.
Quarter 4	DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 5	DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; DHY 1612, Clinical Dental Hygiene 2; and one computer science elective.
Quarter 6	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; DHY 1613, Clinical Dental Hygiene 3.
Quarter 7	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and MTH 1152, Statistical Thinking.
Quarter 8	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and one Northeastern University elective.
Quarter 9	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; and one Northeastern University elective.
Quarter 10	DHY 1301, Introduction to Oral Health Research; DHY 1401, Oral Health Gerontology; ENG 1350, Writing for the Professions; and one Northeastern University elective.
Quarter 11	DHY 1402, Advanced Public Health; and three Northeastern University electives.
Quarter 12	DHY 1403, Dental Seminars; DHY 1410, Independent Study; and DHY 1550, Internship.

Associate in Science Curriculum

Quarter 1	BIO 1160, Functional Human Anatomy and Physiology 1; BIO 1650, Functional Human Anatomy and Physiology 1 Lab; DHY 1100, Oral Anatomy and Histology; DHY 1204, Head and Neck Anatomy; DHY 1211, Dental Hygiene Theory 1; DHY 1220, Radiology 1; and DHY 1611, Clinical Dental Hygiene 1.
Quarter 2	BIO 1161, Functional Human Anatomy and Physiology 2; BIO 1651, Functional Human Anatomy and Physiology 2 Lab; DHY 1209, Periodontology; DHY 1212, Dental Hygiene Theory 2; DHY 1221, Radiology 2; and DHY 1612, Clinical Dental Hygiene 2.
Quarter 3	BIO 1122, Basic Microbiology; BIO 1622, Basic Microbiology Lab; DHY 1240, Nutrition; DHY 1214, Dental Hygiene Theory 3; DHY 1228, Dental Materials; and DHY 1613, Clinical Dental Hygiene 3.
Quarter 4	DHY 1308, Pathology; DHY 1317, Dental Hygiene Theory 4; DHY 1330, Pharmacology; DHY 1614, Clinical Dental Hygiene 4; and ENG 1110, College Writing 1.

Quarter 5	DHY 1315, Dental Hygiene Theory 5; DHY 1331, Pain Control; DHY 1361, Public Health; DHY 1615, Clinical Dental Hygiene 5; and PSY 1111, Foundations of Psychology 1.
Quarter 6	DHY 1316, Dental Hygiene Theory 6; DHY 1362, Community Health; DHY 1364, Law and Ethics; DHY 1616, Clinical Dental Hygiene 6; ENG 1111, College Writing 2; and SOC 1100, Introduction to Sociology.

College of Business Administration

Ira R. Weiss, PhD, *Dean*
James F. Molloy, Jr., PhD, *Senior Associate Dean for Academic Affairs*
William I. Kelly, MS, *Assistant Dean/Director for Graduate Programs*
Brendan D. Bannister, DBA, *Associate Dean for Undergraduate Programs*

Accounting Group

Professors
Sharon M. Bruns, PhD
Paul A. Janell, PhD,
Joseph M. Golemme Professor of Accounting
Ira R. Weiss, PhD

Associate Professors
Jean C. Bedard, PhD
Julie Hertenstein, DBA
Cynthia M. Jackson, PhD
Mario J. Maletta, PhD
Marjorie Platt, PhD
H. David Sherman, DBA

Assistant Professors
John A. Barrick, PhD
James J. Maroney, PhD
Timothy J. Rupert, PhD

Lecturers
Michael D. Cottrill, MAC
Hugh J. Crossland, LLM
Lynn W. Marples, MBA
Peggy L. O'Kelly, MBA

Finance and Insurance Group

Professors
Paul J. Bolster, PhD
Wesley W. Marple Jr., DBA
Joseph W. Meador, PhD
Harlan D. Platt, PhD
Jonathan B. Welch, PhD

Associate Professors
Jeffery A. Born, PhD
Donald G. Margotta, PhD
Emery A. Trahan, PhD

Assistant Professors
Cetin Ciner, PhD
Robert M. Mooradian, PhD
Donald Rich, PhD
Daniel A. Rogers, PhD
Shiawee X. Yang, PhD

Lecturers
Peggy L. Fletcher, MBA
Richard J. Goettle, PhD
Richard S. Swasey Jr., MBA
Ronald M. Whitfield, PhD

Academic Specialist
Steven R. Kursh, PhD

General Management Group

Professors
Robert C. Lieb, DBA
Daniel J. McCarthy, DBA
James F. Molloy Jr., PhD
Ravi Ramamurti, DBA
Ravi Sarathy, PhD
Heidi Vernon, PhD

Associate Professors
William F. Crittenden, PhD
Raymond M. Kinnunen, DBA
Marc H. Meyer, PhD
Carl W. Nelson, PhD

Academic Specialist
John H. Friar, PhD
Joseph M. Giglio, MS, MPA

Assistant Professors
Nicholas Athanassiou, PhD
Louise Kelly, PhD

Lecturers
Richard P. Olsen, DBA
Michael J. Power, BA
Ronald S. Thomas, PhD
Andrew Watson, PhD

Human Resources Group

Professors
Rae Andre, PhD
David P. Boyd, PhD
Ralph Katz, PhD
Sheila M. Puffer, PhD

Associate Professors
Brendan D. Bannister, DBA
Thomas M. Begley, PhD
Cynthia Lee, PhD
Edward F. McDonough III, PhD
Bert A. Spector, PhD
Francis C. Spital, PhD
Edward G. Wertheim, PhD

Assistant Professor
Judith Y. Weisinger, PhD

Lecturer
Leonard J. Glick, EdD

Management Science Group

Professors
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Michael J. Maggard, PhD
Robert A. Millen, PhD
Marius M. Solomon, PhD

Associate Professors
Ramaiya Balachandra, PhD
Robert A. Parsons, MA
Eileen M. Trauth, PhD
Merrill E. Warkentin, PhD
Mustafa R. Yilmaz, PhD
Michael H. Zack, DBA

Lecturers
Richard J. Briotta, MBA
Mohamed Habibullah, PhD

Assistant Professors
Yang W. Lee, PhD
Marianne C. Murphy, PhD

Marketing Group

Professors
Samuel Rabino, PhD
Frederick Wiseman, PhD

Associate Professors
Gloria Barczak, PhD
Dan T. Dunn Jr., DBA
Fareena Sultan, PhD
Robert F. Young, DBA

Assistant Professors
Bruce H. Clark, PhD
James A. Eckert, PhD

Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to College Writing I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation. Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

Minor in Business Administration

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macroeconomics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Financial Accounting; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs that recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Five-Year Bachelor of Science Curriculum for First Three Quarters

The courses taken in the first three quarters of the five-year program are the same for all concentrations.

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, College Writing 1; and two arts and sciences electives.
Quarter 2	MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, College Writing 2; MSC 1226, Computer-Based Information Systems; and one arts and sciences elective.

Four-Year Bachelor of Science Curriculum for First Five Quarters

The courses taken in the first five quarters of the four-year program are the same for all concentrations.

Quarter 1	MGT 1115, Introduction to Business; non-business elective or MTH 1113, Mathematics for Business and Economics; ENG 1110, College Writing 1, and a non-business elective.
Quarter 2	ECN 1115, Principles of Macroeconomics; MTH 1114, Calculus for Business; and two non-business electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, College Writing 2; MSC 1226, Computer-Based Information Systems; and two non-business electives.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two non-business electives.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; ENG 1381, Writing for the Professions: Business Administration; and two non-business electives.

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant. See pages 218–219 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See above.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.

	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
	Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
	Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and one nonbusiness elective.
	Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
	Quarter 9	ACC 1347, Auditing; MGT 1446, Managing Legal, Ethical, and Social Issues; an upper division writing requirement; and an open elective.
	Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
	Quarter 11	Three open electives and a nonbusiness elective.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 99.
	Quarter 6	ACC 1331, Intermediate Accounting 1; ACC 1339, Cost Accounting; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management.
	Quarter 7	ACC 1332, Intermediate Accounting 2; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one nonbusiness elective.
	Quarter 8	ACC 1343, Intermediate Accounting 3; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
	Quarter 9	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; ACC 1345, Accounting Systems; and two open electives.
	Quarter 10	ACC 1347, Auditing; and three open electives.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems. See page 219 for course descriptions.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 99.
	Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.
	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
	Quarter 6	ENT 1330, Entrepreneurship; FIN 1438, Principles of Finance 1; an open elective; and a nonbusiness elective.
	Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and an open elective.
	Quarter 8	ENT 1344, Starting and Managing a New Business; a nonbusiness elective; an open elective; and upper-division writing requirement.
	Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1441, Operations Management; and an open elective.
	Quarter 10	MGT 1450, Business Policy; ENT 1352, Planning and Growing New Ventures; and two open electives.
	Quarter 11	ENT 1358, Small Business Institute Field Project; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 99.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one open elective; and one nonbusiness elective.
Quarter 7	ENT 1330, Small Business Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	FIN 1770, Small Business Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; ENT 1344, Opportunity Analysis and Venture Capital; and an open elective.
Quarter 9	MGT 1450, Business Policy; and four open electives.
Quarter 10	ENT 1352, New Venture Creation; ENT 1358, Small Business Institute Project; and an open elective.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions. See pages 220–222 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; and two nonbusiness electives.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.
Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Legal, Ethical, and Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 99.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MSC 1441, Operations Management; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2, HRM 1433, Organizational Behavior and Design; one open elective; and one nonbusiness elective.
Quarter 8	FIN 1335, Managerial Finance; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
Quarter 9	FIN 1346, Investment Management; MGT 1450, Business Policy; one finance elective; and two open electives.
Quarter 10	Two finance electives and two open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse workforce and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities. See pages 222–223 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; MKT 1435, Introduction to Marketing; and one nonbusiness elective.
Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; an open elective; and a nonbusiness elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; human resources management elective; upper-division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 99.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; HRM 1433, Organizational Behavior and Design.
Quarter 7	HRM 1332, Introduction to Human Resource Management; FIN 1439, Principles of Finance 2; two open electives; and one nonbusiness elective.
Quarter 8	HRM 1345, Contemporary Labor Issues; MGT 1446, Managing Legal, Ethical, and Social Issues; one HRM elective; and an open elective.
Quarter 9	HRM 1348, Reward Systems; HRM 1349, Selection and Assessment; MGT 1450, Business Policy; and two open electives.
Quarter 10	Human resources management elective and three open electives.

International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Bachelor of Science in International Business

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see page 223) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middler, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships. See page 223 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433,Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; two open electives; and one nonbusiness elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international nonbusiness elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Legal, Ethical, and Social Issues; upper-division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 99.
Quarter 6	INB 1338, Introduction to International Business; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and one nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and two open electives.
Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; one international business elective; and two open electives.
Quarter 9	FIN 1759, International Financial Markets; MGT 1450, Business Policy; one business elective; and two open electives.
Quarter 10	INB 1352, Seminar in International Business; one international business elective; and two open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to "people problems" in order to stress the importance of developing an effective workforce. See pages 223–224 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	MSC 1341, Information Resource Management; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and a nonbusiness elective.
Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; a business elective; an open elective; and upper-division writing requirement.
Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
Quarter 11	Business elective and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 99.
Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one business elective; and one nonbusiness elective.
Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; and three open electives.
Quarter 9	MSC 1341, Information Resource Management; MGT 1450, Business Policy; MGT 1345, Legal Aspects of Business; and two open electives.
Quarter 10	HRM 1350, Strategic Management of Human Resources; MGT 1350, Advanced Strategic Management; and two open electives.

Management Information Systems

Businesses process materials, products, and information. In the industrial era of the past, management of materials and products was the focus. In the Information Age, success, for individuals and for companies, requires the ability to manage information effectively.

The goal of the Management Information Systems (MIS) concentration is to teach future managers and analysts how to use information technology (IT) to help individuals and organizations perform more efficiently and effectively. Students develop new, cutting-edge approaches that allow them to use this powerful resource to its greatest advantage. Delivering the right information in the right form and format to the right people at the right time is essential in today's business world. Companies use MIS to achieve a competitive edge through the intelligent design and use of IT. Students study database management, decision support systems, telecommunications, systems analysis and design, program design methodologies, and other IT topics, such as digital multimedia, expert systems, the Web, and electronic commerce.

MIS can only be effectively designed and implemented when understood in the context of the individual user, the work group, the organization, and society. Therefore, the study of MIS at Northeastern combines a focus on technology with a focus on organizational systems within the business context.

Not only do students develop technical and problem-solving skills that are in high demand by employers, they learn to identify how IT can best be used within a business organization.

MIS managers interact frequently with other managers throughout an organization; therefore, students are encouraged to complete a dual concentration in MIS and another area of business. Graduates of this program enter a wide range of professions that suit their particular interests. Professional options include systems analyst, programmer, database designer and administrator, webmaster, software helpdesk expert, project specialist, consultant, network administrator, and IT specialist within other departments, such as financial services or accounting. See pages 224–225 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 7	FIN 1439, Principles of Finance 2; MSC 1335, Telecommunications and Networks; an open elective; and a nonbusiness elective.
Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.
Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1336, Business Programming; upper-division writing requirement; and a nonbusiness elective.
Quarter 10	MGT 1450, Business Policy; MSC 1341, Information Resource Management; and one open elective.
Quarter 11	MSC 1342, Business Systems Integration; and three open electives.

Four-Year Bachelor of Science Curriculum

Quarters 1–5	See page 99.
Quarter 6	MSC 1335, Telecommunications and Networks; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and a nonbusiness elective.
Quarter 7	MSC 1336, Business Programming; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
Quarter 8	MSC 1341, Information Resource Management; MGT 1446, Managing Legal, Ethical, and Social Issues; and two open electives.
Quarter 9	MSC 1330, Data Management; MGT 1450, Business Policy; MSC 1332, Business Support Systems for Business; and two open electives.
Quarter 10	MSC 1342, Business Systems Integration; and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management. See pages 226–227 for course descriptions.

Five-Year Bachelor of Science Curriculum

Quarters 1–3	See page 99.
Quarter 4	ACC 1111, Financial Accounting; MKT 1435, Introduction to Marketing; MSC 1200, Business Statistics 1; and a nonbusiness elective.

	Quarter 5	ACC 1112, Managerial Accounting; MSC 1201, Business Statistics 2; and two nonbusiness electives.
	Quarter 6	FIN 1438, Principles of Finance 1; two nonbusiness electives; and an open elective.
	Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
	Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper-division writing requirement.
	Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
	Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
	Quarter 11	Marketing elective and three open electives.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 99.
	Quarter 6	FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; one open elective; and one nonbusiness elective.
	Quarter 7	MKT 1331, Marketing Management; FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and one open elective.
	Quarter 8	MKT 1341, Marketing Research; MGT 1446, Managing Legal, Ethical, and Social Issues; one MKT elective; and an open elective.
	Quarter 9	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; one MKT elective; and two open electives.
	Quarter 10	Marketing elective and three open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is therefore useful for a student to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure. See page 227 for course descriptions.

Five-Year Bachelor of Science Curriculum	Quarters 1–3	See page 99.
	Quarter 4	ACC 1111, Financial Accounting; MSC 1200, Business Statistics 1; and two nonbusiness electives.
	Quarter 5	ACC 1112, Managerial Accounting; MKT 1435, Introduction to Marketing; MSC 1201, Business Statistics 2; and a nonbusiness elective.
	Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433,Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.

	Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; an open elective; and a nonbusiness elective.
	Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
	Quarter 9	MGT 1446, Managing Legal, Ethical, and Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper-division writing requirement.
	Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
	Quarter 11	TRN 1353, Seminar in Transportation; and three open electives.
Four-Year Bachelor of Science Curriculum	Quarters 1–5	See page 99.
	Quarter 6	TRN 1333, Domestic Transportation System; FIN 1438, Principles of Finance 1; MSC 1441, Operations Management; and a nonbusiness elective.
	Quarter 7	FIN 1439, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; one transportation elective; and one open elective.
	Quarter 8	MGT 1446, Managing Legal, Ethical, and Social Issues; and three open electives.
	Quarter 9	MGT 1450, Business Policy; TRN 1344, Business/Logistics; one transportation elective; and two open electives.
	Quarter 10	TRN 1353, Seminar in Transportation and Logistics; one transportation elective; and two open electives.

College of Computer Science

Larry A. Finkelstein, PhD, *Dean*
Agnes H. Chan, PhD, *Associate Dean and Director of Graduate Studies*
Richard A. Rasala, PhD, *Associate Dean and Director of Undergraduate Studies*
Marie P. Hinds, BS, *Director, Student and Administrative Services*

Professors
Agnes H. Chan, PhD
Gene D. Cooperman, PhD
Harriet J. Fell, PhD
Larry A. Finkelstein, PhD
Karl J. Lieberherr, PhD
Viera K. Proulx, PhD
Richard A. Rasala, PhD
Betty J. Salzberg, PhD
Raoul N. Smith, PhD
Mitchell Wand, PhD
Patrick S. P. Wang, PhD

Associate Professors
Kenneth P. Baclawski, PhD
John Casey, BA
William D. Clinger, PhD
Robert P. Futrelle, PhD
Carole D. Hafner, PhD
Ronald J. Williams, PhD
Bryant W. York, PhD

Assistant Professors
David H. Lorenz, DSc
Ibrahim M. Matta, PhD
Rajmohan Rajaraman, PhD

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices that support the development of high-quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education. See pages 228–230 for course descriptions.

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.8
Middler	2.0
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook.*

Minor in Computer Science

This minor is particularly valuable to non–computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Dual Majors

The College currently offers three dual majors: Computer Science and Cognitive Psychology, Computer Science and Mathematics, and Computer Science and Physics. Specific information about the dual majors may be obtained from the College Administration Office in 161 Cullinane Hall or by calling 617.373.2462.

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1137, Discrete Mathematics; and one basic social science *or* MTH 1119, Precalculus for Computer Science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1140, Calculus for Science Majors 1; MTH 1187, Probability A; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, College Writing 2; MTH 1141, Calculus for Science Majors 2; and one sub-area or general elective *or* basic social science.
Quarter 4	COM 1130, Computer Organization and Design; PHL 1215, Symbolic Logic; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; MTH 1142, Calculus for Science Majors 3; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and one sub-area or general elective.
Quarter 6	COM 1330, Operating Systems Concepts; COM 1340, Recursive Thinking; ECE 1178, Digital Electronics for Computer Science Majors; MTH 1301, Linear Algebra 1; and PHY 1223, Physics 3.
Quarter 7	COM 1350, Automata and Formal Language; ECE 1229, Digital Systems Laboratory; ECE 1382, Computer Engineering 2: Design of Digital Logic Machines and Circuits; ENG 1125, Technical Writing 1; and one sub-area or general elective.
Quarter 8	COM 1205, Software Design; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
Quarter 9	COM 1358, Analysis of Programming Languages; MTH 1240, Chaos and Fractals, *or* MTH 1349, Numerical Analysis 1, *or* MTH 1390, Mathematical Statistics; one computer science elective; and one sub-area or general elective.
Quarter 10	COM 1391, Data; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; two computer science electives; and two sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1137, Discrete Mathematics; and one basic social science *or* MTH 1119, Precalculus for Computer Science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1140, Calculus for Science Majors 1; MTH 1187, Probability A; and one basic social science.
Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, College Writing 2; MTH 1141, Calculus for Science Majors 2; and one sub-area or general elective *or* basic social science.
Quarter 4	COM 1130, Computer Organization and Design; PHL 1215, Symbolic Logic; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; MTH 1142, Calculus for Science Majors 3; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and one sub-area or general elective.

	Quarter 6	COM 1350, Automata and Formal Language; ENG 1125, Technical Writing; PHY 1223, Physics for Science and Engineering Students 3; one sub-area or general elective.
	Quarter 7	COM 1330, Operating Systems Concepts; COM 1340, Recursive Thinking; ECE 1178, Digital Electronics for Computer Science Majors; MTH 1301, Linear Algebra 1; and SOC 1485, Computers and Society.
	Quarter 8	COM 1358, Analysis of Programming Languages; ECE 1229, Digital Systems Laboratory; ECE 1382, Computer Engineering 2: Design of Digital Logic Machines and Circuits; one computer science elective; and one sub-area or general elective.
	Quarter 9	COM 1390, Algorithms; MTH 1240, Chaos and Fractals, *or* MTH 1349, Numerical Analysis 1, *or* MTH 1390, Mathematical Statistics; one computer science elective; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1391, Data; and two sub-area or general electives.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1137, Discrete Mathematics; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1140, Calculus for Science Majors 1; MTH 1187, Probability; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structures 2; ENG 1111, College Writing 2; MTH 1141, Calculus for Science Majors 2; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; PHL 1215, Symbolic Logic; one science elective; and one general elective.
	Quarter 5	COM 1204, Object-Oriented Design; COM 1350, Automata and Formal Languages; MTH 1142, Calculus for Science Majors 3; and one science elective.
	Quarter 6	COM 1340, Recursive Thinking; COM 1390, Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG middler-year writing requirement; and two arts and sciences core courses.
	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Four-Year Bachelor of Arts Curriculum	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, College Writing 1; MTH 1137, Discrete Mathematics; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1140, Calculus for Science Majors 1; MTH 1187, Probability; and one arts and sciences core course.
	Quarter 3	COM 1201, Algorithms and Data Structure 2; ENG 1111, College Writing 2; MTH 1141, Calculus for Science Majors 2; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Design; PHL 1215, Symbolic Logic; one science course; and one arts and sciences core course.
	Quarter 5	COM 1204, Object-Oriented Design; COM 1350, Automata and Formal Languages; MTH 1142, Calculus for Science Majors 3; and one science course.
	Quarter 6	COM 1358, Analysis of Programming Languages; one general elective; and two arts and sciences core courses.

Quarter 7	COM 1340, Recursive Thinking; COM 1390, Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
Quarter 8	ENG middler-year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*
Robert D. Croatti, AB, *Associate Dean for College Operations*
Lester W. McCullough Jr., BA, *Assistant Dean for Administrative Services*
Robert E. Fuller, MA, *Assistant Dean for Student Services*
Stephanie R. Weinstein, BS, *Academic Counselor*

Professor
Edith E. Flynn, PhD

Associate Professors
Michael E. Buerger, PhD
Frank A. Schubert, JD
Wallace W. Sherwood, LLM

Assistant Professors
Jennifer L. Hartman, PhD
John F. McDevitt, MPA
Dana M. Nurge, PhD
Michael Shively, PhD
Michael G. Turner, PhD
Richard P. Wiebe, JD, PhD

Schulman Professor
Harvey Burstein, JD

Hadley Professor for Criminal Justice and Law
Scott Harshbarger, JD

Visiting Professors
Jeb A. Booth, MA
Donald Cochrane, EdD
Roderick L. Ireland, LLM, PhD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its kind. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors of the criminal justice field.

The college has a unified undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains. Building on a solid foundation of required courses focusing on law, criminology, administration of justice, and research tools, the curriculum allows students to tailor their elective coursework, in such areas as homicide, terrorism, victims, juvenile justice, security, courts, and corrections, to suit their own professional interests. In addition, students take a variety of courses in other parts of the University, in such topic areas as computer science, English, math, history, economics, political science, sociology, and psychology.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections. Students may also elect not to specialize, but instead to span the broadest possible coverage of the field.

In the policing and security emphasis students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping-stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units. These career-oriented experiences help students to better understand the theory and research presented in their classes.

The college maintains close ties to criminal justice agencies in the community, such as the Boston Police Department and the Office of the Attorney General, and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system. In addition, the college cooperates with the mayor's office and a number of private corporations in helping to run various community-based anti-crime programs. The college faculty also has a strong voice and participates actively in research and policy-making at a national and international level. In addition to a variety of major research projects, the college houses the *Journal of Quantitative Criminology*, a leading international journal of research in criminology and criminal justice. See pages 232–234 for course descriptions.

Class Entrance Requirements

Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.

Sophomore	1.8
Middler	1.8
Junior	1.8
Senior	1.9
To graduate	2.0

Graduation Requirements

Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.

Transfer Credit

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

Bachelor of Science Curriculum

Quarter 1	CJ 1001, Critical Issues in Criminal Justice 1; CJ 1151, Introduction to Law and the Legal Process 1; ENG 1110, College Writing 1; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CJ 1002, Critical Issues in Criminal Justice 2; COM 1105, Computer Science and Its Applications; POL 1110, Introduction to Politics; PSY 1112, Foundations in Psychology 2; and SOC 1110, Introduction to Sociology.
Quarter 3	CJ 1101, Administration of Criminal Justice; CMN 1116, Public Speaking; ENG 1111, College Writing 2; and POL 1111, Introduction to American Government.
Quarter 4	CJ 1201, Criminology; one criminal justice diversity requirement; one math/science requirement 1; and one history requirement 1.
Quarter 5	CJ 1251, Introduction to Criminal Law; ECN 1000, Economic Problems and Perspectives; POL 1318, State and Local Government; and one history requirement 2.
Quarter 6	CJ 1252, Criminal Due Process; CJ 1453, Criminal Justice Research Methods; ENG 1350, Writing for the Professions; and one math/science requirement 2.
Quarter 7	CJ 1454, Criminal Justice Statistics; one criminal justice elective; one non–criminal justice elective; and one philosophy requirement.
Quarters 8–11	32 quarter hours of criminal justice electives and 32 quarter hours of non–criminal justice requirements.

College of Engineering

Allen L. Soyster, PhD, *Dean*
Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*
Yaman Yener, PhD, *Associate Dean and Director, Graduate School of Engineering*
Gerard Voland, PhD, *Interim Director of the School of Engineering Technology and the Lowell Institute School*
Cynthia Snow, MA, *Assistant Dean for Administration*
David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*
Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*
Mahendra Singh, MS, *Assistant Dean for Educational and Computer Technology*
Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college helps students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil, electrical, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years, including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. A program of study for this option is arranged on an individual basis with a faculty adviser. A set of courses related to biomedical engineering is also available.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification in an engineering discipline are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

Bachelor of Science/ Master of Science Joint-Degree Program

The departments of electrical and computer engineering and mechanical, industrial, and manufacturing engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Class Entrance Requirements

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

Graduation Requirements

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university must complete at least 48 quarter hours at Northeastern University immediately preceding graduation to be eligible to receive the Bachelor of Science degree.

Bachelor of Science Curriculum for First Three Quarters

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1110, College Writing 1; GE 1001, Introduction to Engineering; GE 1103, Engineering Design; MTH 1123, Calculus for Engineering Majors 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1111, College Writing 2; GE 1002, Introduction to Engineering Cooperative Education; GE 1102, Engineering Problem Solving with Application Software; MTH 1124, Calculus for Engineering Majors 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1101, Engineering Problem-Solving and Computation; MTH 1125, Calculus for Engineering Majors 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Fine, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors
Albert Sacco Jr., PhD
George A. Snell Professor of Engineering
Ronald J. Willey, PhD

Associate Professor
Gilda A. Barabino, PhD

Professor Emeritus
John A. Williams, PhD
Donald L. Wise, PhD

Associate Professors Emeritus
Bernard M. Goodwin, ScD
Richard R. Stewart, PhD

The goal of the chemical engineering program is to offer students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new products such as wonder drugs, materials that improve life on earth, and systems that make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, they also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge toward fully professional levels. See pages 235–236 for course descriptions.

Bachelor of Science Curriculum	Quarters 1–3	See page 115. (In Quarter 3 replace PHY 1523 with CHM 1138, General Chemistry Lab.)
	Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1223, Calculus for Engineering Majors 4; and one social science/humanities elective.
	Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
	Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
	Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing.
	Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
	Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
	Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
	Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil and Environmental Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors
Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Thomas C. Sheahan, ScD
Ali Touran, PhD
Irvine W. Wei, PhD

Professor Emeritus
Paul H. King, PhD
Kenneth M. Leet, ScD

Associate Professors
Dionisio Bernal, PhD
Peter G. Furth, PhD
Richard J. Scranton, SM

Assistant Professors
Akram N. Alshawabkeh, PhD
Fernando R. Miralles-Wilhelm, PhD
Ajiboye F. Oluokun, PhD
Sara Wadia-Fascetti, PhD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

In addition to the basic program in civil engineering, the department offers an option in environmental engineering. This option allows students who wish to specialize in environmental engineering to gain a stronger background in related environmental sciences.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams. See pages 236–238 for course descriptions.

Bachelor of Science in Civil Engineering Curriculum

Quarters 1–3	See page 115.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus for Engineering Majors 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1250, Steel Design 1; CIV 1310, Fluid Mechanics; and MTH 1230, Linear Algebra.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	MIM 1366, Dynamics for Civil Engineers; two technical electives; and one social science/humanities elective.
Quarter 9	CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1665, Professional Issues for Civil Engineers; MIM 1215, Engineering Economy; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

Environmental Engineering Concentration Curriculum

Quarters 1–3	See page 115.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus for Engineering Majors 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CIV 1240, Concrete Design 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing.
Quarter 8	One engineering breadth elective; one environmental science elective; and two technical electives.
Quarter 9	CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1640, Applied Probability Theory for Civil Engineers; CIV 1665, Professional Issues for Civil Engineers; and MIM 1215, Engineering Economy.
Quarter 10	CIV 1350, Environmental and Hydraulics Lab; one environmental science elective; one social science/humanities elective; and one general elective.
Quarter 11	CIV 1370, Air Pollution; CIV 1395, Environmental Design Projects; one technical elective; and one social science/humanities elective.

Electrical and Computer Engineering

Fabrizio Lombardi, PhD, *ITC Professor and Chair*
Arvin Grabel, ScD, *Professor and Associate Chair*

Professors
Soeren Buus, PhD
Chung Chan, PhD
Anthony J. Devaney, PhD
Samuel Fine, SM, MD
Sarma S. Mulukutla, PhD
Sheila Prasad-Hinchey, PhD
Sheldon S. Sandler, PhD
Martin E. Schetzen, ScD
Philip E. Serafim, ScD
Michael B. Silevitch, PhD
Carmine Vittoria, PhD

Associate Professors
David Brady, PhD
Dana Brooks, PhD
Jill D. Crisman, PhD
Jeffrey A. Hopwood, PhD
Vinay Ingle, PhD
Mieczyslaw M. Kokar, PhD
Miriam E. Lesser, PhD
Hanoch Lev-Ari, PhD
Elias S. Manolakos, PhD
Nicol E. McGruer, PhD
Stephen W. McKnight, PhD
David J. McLaughlin, PhD
Carey M. Rappaport, ScD
Masoud Salehi, PhD
Bahram Shafai, ScD
Aleksandar M. Stankovic, PhD
Ioannis Stavrakakis, PhD
Gilead Tadmor, PhD
Man-Kuan Vai, PhD
Paul M. Zavracky, PhD

Assistant Professors
David R. Kaeli, PhD
Bradley Lehman, PhD
Lisa McIlrath, PhD
Waleed Meleis, PhD
Fred John Meyer, PhD
Eric Miller, PhD

Lecturers
Jack I. Hanania, PhD
Norman C. Poirier, MS
Jacob Shekel, ScD

Professor Emeritus and Principal Research Scientist
John G. Proakis, PhD

The components of the information age—global communication systems, computers and chips, and the software that runs them—are made possible through the effort of electrical and computer engineers (ECEs). So are pacemakers, magnetic resonance imaging, and the recent mission to Mars. Today, ECEs are developing concepts and working to translate these ideas into the next generation of products, from computers and safe, energy-efficient vehicles, to radar that can detect unexploded land mines from the air, and microrobots that diagnose disease from inside the body.

Most ECEs work in the traditional areas of communications: computation and control and the components required to realize such systems. They are involved in design and product development, testing and quality control, sales and marketing, and manufacturing. Other ECEs use their problem-solving skills in areas as diverse as bioengineering and health care, electronic music, meteorology and experimental psychology. Some graduates utilize their ECE background to have successful careers as physicians, financial analysts, attorneys, and entrepreneurs.

Successful engineers need to organize and adapt information to solve problems. They also must work effectively in teams and communicate well. The ECE major develops these skills and provides the appropriate technical background for a successful career. The core of the curriculum consists of electronic circuits and devices, computer architecture and software design, electromagnetics, and system analysis and design. These are based on courses in mathematics, physics, and computer applications. English, technical writing, and other humanities and social science courses round out the program and help build communication skills.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuits analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, and digital signal processing.

In addition to the standard electrical engineering program, the department offers a concentration in computer engineering. Based on a common core program, the concentration provides for more depth of study during the last two years. Computer engineering allows specialization in both designing digital computers and integrating them within larger systems for communications, resource management, and automatic control. In the cooperative work phase of the program, the student's level of responsibility grows as s/he gains theoretical and technical knowledge through academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers. See pages 238–243 for course descriptions.

Bachelor of Science in Electrical Engineering Curriculum

Quarters 1–3	See page 115.
Quarter 4	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; MTH 1225, Differential Equations (Engineering); PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; MIM 1245, Materials Science; MTH 1223, Calculus for Engineering Majors 4; and one social science/ humanities elective.
Quarter 6	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab; and ECE 1363, Electromagnetic Field Theory 1.

	Quarter 7	ECE 1332, Linear Systems 1; ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Fields Lab; and ENG 1125, Technical Writing.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; MIM 1270, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; MTH 1384, Probability; and one technical elective (level 1).
	Quarter 9	ECE 1355, Communication Systems 1; two technical electives (level 1); and one social science/humanities elective.
	Quarter 10	ECE 1501, Capstone Design 1; two technical electives (level 1 or level 2); one technical elective (level 2); and one social science/humanities elective.
	Quarter 11	ECE 1502, Capstone Design 2; two technical electives (level 2); and one social science/humanities elective.
Bachelor of Science in Electrical Engineering, Computer Engineering Concentration Curriculum	Quarters 1–3	See page 115.
	Quarters 4–7	Same as electrical engineering.
	Quarter 8	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; ECE 1383, Computer Engineering 3 and ECE 1238, Microprocessor Laboratory; MIM 1245, Thermodynamics *or* MIM 1364, Mechanics for Electrical Engineers; and MTH 1384, Probability.
	Quarter 9	ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab; ECE 1355, Communication Systems 1; one technical elective (level 1); and one social science/humanities elective.
	Quarter 10	ECE 1384, Computer Engineering 4; ECE 1501, Capstone Design 1; one technical elective (level 1); one technical elective (level 1 or 2); and one social science/humanities elective.
	Quarter 11	ECE 1502, Capstone Design 2; one technical elective (level 1 or 2); one technical elective (level 2); and one social science/humanities elective.

Note: Changes to the electrical engineering and computer engineering curricula are being proposed and may be in effect for the 1999–2000 academic year.

General Engineering

Advisory Committee
Arvin Grabel, ScD, *Electrical Engineering, Chair*
Peter Furth, PhD, *Civil and Environmental Engineering*
Mohamad Metghalchi, ScD, *Mechanical Engineering*
Ronald F. Perry, PhD, *Industrial Engineering*
Ralph Buonopane, PhD, *Chemical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering. See pages 243–244 for course descriptions.

Bachelor of Science Curriculum	Quarters 1–3	See page 115. (Replace CHM 1131 and CHM 1132 with social science/humanities electives.)
	Quarter 4	MTH 1223, Calculus for Engineering Majors 4; one basic science elective; one engineering science elective; and one social science/humanities elective.
	Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.

Quarter 6	ENG 1340, Writing Workshop; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Mechanical, Industrial, and Manufacturing Engineering

John W. Cipolla Jr., PhD, *Donald W. Smith Professor of Engineering and Chair*

Professors
George G. Adams, PhD
Thomas P. Cullinane, PhD
Alexander M. Gorlov, PhD
Yiannis A. Levendis, PhD
Ronald R. Mourant, PhD
Hamid Nayeb-Hashemi, PhD
John N. Rossettos, PhD
Allen L. Soyster, PhD
Mohammad E. Taslim, PhD
Yaman Yener, PhD
Ibrahim Zeid, PhD

Associate Professors
Teiichi Ando, PhD
Nasser Fard, PhD
Surendra M. Gupta, PhD
Olusegun J. Ilegbusi, PhD
Gregory J. Kowalski, PhD
Emanuel S. Melachrinoudis, PhD
Achille Messac, PhD
Mohamad Metghalchi, ScD
Uichiro Narusawa, PhD
Ronald F. Perry, PhD
Gerard Voland, PhD

Assistant Professors
James C. Benneyan, PhD
Jacqueline A. Isaacs, PhD
Sagar V. Kamarthi, PhD
Bruce Wilson, PhD

Adjunct Professor
Gerald G. Kleinstein, PhD

Professors Emeritus
Thomas E. Hulbert, MS
Richard J. Murphy, PhD

Senior Research Engineer
Joseph T. Blucher, PhD

Senior Research Scientist and Professor (Emeritus)
Welville B. Nowak, PhD

The Department of Mechanical, Industrial, and Manufacturing Engineering offers two accredited programs leading to a Bachelor of Science in Industrial Engineering and a Bachelor of Science in Mechanical Engineering.

Industrial Engineering

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance the goals of the enterprise.

The program in industrial engineering offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering workstations by the senior year. See pages 244–248 for course descriptions.

Bachelor of Science in Industrial Engineering Curriculum

Quarters 1–3	See page 115.
Quarter 4	ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics; MIM 1240, Materials Science; MIM 1280, Thermodynamics 1; and MTH 1223, Calculus for Engineering Majors 4.
Quarter 5	MIM 1212, Engineering Probability and Statistics 1; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics; MTH 1230, Linear Algebra for Engineers; MIM 1420, Computers and Information Systems; and MIM 1320, Work Design.
Quarter 7	MIM 1312, Engineering Probability and Statistics 2; MIM 1325, Operations Research 1; one technical elective; and one social science/humanities elective.
Quarter 8	ECE 1171, Electrical Engineering 1; MIM 1430, Manufacturing Systems and Techniques; MIM 1522, Human-Machine Systems; and one social science/humanities elective.
Quarter 9	ENG 1125, Technical Writing; MIM 1410, Digital Simulation Techniques; MIM 1425, Operations Research 2; and one open elective.
Quarter 10	MIM 1501, Design Project 1; MIM 1510, Production and Inventory Control; MIM 1516, Quality Assurance; and one technical elective.
Quarter 11	MIM 1502, Design Project 2; two technical electives; and one social science/humanities elective.

Mechanical Engineering

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment. See pages 244–248 for course descriptions.

Bachelor of Science in Mechanical Engineering Curriculum

Quarters 1–3	See page 115.
Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; MIM 1240, Materials Science; MIM 1280, Thermodynamics 1; and MTH 1223, Calculus for Engineering Majors 4.
Quarter 5	MIM 1212, Engineering Probability and Statistics 1; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ENG 1340, Writing Workshop; MIM 1300, Measurement and Analysis; MIM 1355, Strength of Materials 1; MIM 1375, Fluid Mechanics; and MTH 1230, Linear Algebra.
Quarter 7	MIM 1356, Strength of Materials 2; MIM 1360, Dynamics; MIM 1370, Heat Transfer; and MIM 1380, Thermodynamics 2.

Quarter 8	MIM 1400, Mechanical Engineering Computation and Interpretation; MIM 1445, Materials Processing *or* ECE 1171, Electrical Engineering 1; MIM 1450, Mechanical Design; and one social science/humanities elective.
Quarter 9	MIM 1440, Mechanical Behavior of Materials *or* ECE 1171, Electrical Engineering 1; MIM 1455, Mechanical Vibrations; MIM 1475, Thermal Design; and one social science/humanities elective.
Quarter 10	MIM 1501, Design Project 1; two technical electives; and one social science elective.
Quarter 11	MIM 1502, Design Project 2; two technical electives; and one social science/humanities elective.

Part-Time Evening Engineering

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil and environmental, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact the Student Services Office, 220 Snell, 617.373.2185. The program coordinator is Caryn Vigoda, MEd.

Part-Time Evening Curriculum for Bachelor of Science

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1103, Engineering Design and MTH 1123, Calculus for Engineering Majors 1.
	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1124, Calculus for Engineering Majors 2.
	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1125, Calculus for Engineering Majors 3.
Second Year	Fall Quarter	MTH 1223, Calculus for Engineering Majors 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
	Winter Quarter	MTH 1225, Differential Equations (Engineering) 1; and PHY 1222, Physics 2.
	Spring Quarter	GE 1101, Engineering Problem-Solving and Computation; PHY 1223, Physics 3; and PHY 1523, Physics 3 Lab.

Part-Time Evening Curriculum for Bachelor of Science in Civil and Environmental Engineering

Third and Fourth Years		CIV 1340, Environmental Engineering 1; CIV 1510, Materials; CIV 1511, Materials Lab; CIV 1620; Engineering Measurements; MIM 1212, Probabilistic Analysis for Engineers; MIM 1215, Engineering Economy; MIM 1250, Engineering Mechanics; MIM 1268, Dynamics 1; MIM 1354, Strength of Materials; MIM 1374, Fluid Mechanics; MTH 1230, Linear Algebra for Engineers; and two technical electives.
Fifth and Sixth Years		CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1240, Concrete Design 1; CIV 1250, Steel Design 1; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental and Hydraulic Design Lab; CIV 1395, Environmental Design Projects; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; one general elective; and three technical electives.
		Technical electives: CIV 3607, Traffic Engineering; CIV 3642, Transportation Planning; ECE 1171, Electrical Engineering 1; MIM 1241, Materials Science; MIM 1270, Thermodynamics; and PHY 1224, Physics for Engineering Students 4.
	Summer Quarters	During the summer quarters students are expected to take ENG 1110, College Writing 1; ENG 1111, College Writing 2; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.

Part-Time Evening Curriculum for Bachelor of Science in Electrical Engineering

Third Year	Fall Quarter	ECE 1240, Introduction to Electrical Engineering Lab; ECE 1381, Computer Engineering 1; and PHY 1224, Physics 4.
	Winter Quarter	ECE 1215, Circuits 1 and ECE 1241, Circuits Lab; and MIM 1245, Materials Science.

	Spring Quarter	ECE 1246, Circuits 2; ECE 1341, Electronics 1 and ECE 1242, Electronics Lab 1.
Fourth Year	Fall Quarter	ECE 1342, Electronics 2 and ECE 1243, Electronics Lab 2; ECE 1382, Computer Engineering 2 and ECE 1229, Digital Systems Lab.
	Winter Quarter	ECE 1332, Linear Systems 1; and MIM 1364, Mechanics for Electrical Engineers *or* MIM 1270, Thermodynamics.
	Spring Quarter	ECE 1333, Linear Systems 2 and ECE 1226, Discrete Systems Lab; and MTH 1384, Probability.
Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1; and one technical elective (level 1).
	Winter Quarter	ECE 1364, Electromagnetic Field Theory 2 and ECE 1227, Electromagnetic Fields Lab; and one technical elective (level 1).
	Spring Quarter	ECE 1355, Communication Systems 1; and one technical elective (level 1).
Sixth Year	Fall Quarter	One technical elective (level 1); and one technical elective (level 2).
	Winter Quarter	ECE 1501, Capstone Design 1; one technical elective (level 1); and one technical elective (level 2).
	Spring Quarter	ECE 1502, Capstone Design 2; and one technical elective (level 2).
	Summer Quarters	During the summer quarters students are expected to take ENG 1110, College Writing 1; ENG 1111, College Writing 2; five adviser-approved social science/humanities electives; and ENG 1125, Technical Writing.

Technical electives (level 1). ECE 1228, Energy Devices Lab; ECE 1235, Control Systems Lab; ECE 1238, Microprocessor Lab; ECE 1308, Physical Electronics; ECE 1343, Electronic Design 1; ECE 1370, Electric Energy Devices; ECE 1383, Computer Engineering 3: Microprocessor-Based Design; ECE 1420, Control Systems; and ECE 1471, Elements of Power Systems.

Technical electives (level 2). ECE 1230, VLSI System Design Lab; ECE 1231, Power Systems Lab; ECE 1234, Digital Signal Processing Lab; ECE 1351, Special Topics in IC Design; ECE 1384, Computer Engineering 4: Computer Organization and Design; ECE 1455, Communication Systems 2; ECE 1456, Digital Signal Processing; ECE 1458, Communication Networks; ECE 1486, Numerical Methods and Computer Applications; ECE 1472, Power System Analysis; and MTH 1351, Functions of a Complex Variable 1.

Computer Engineering Concentration

Required technical electives: ECE 1383, Computer Engineering 3 (level 1) and ECE 1238, Microprocessor Laboratory; ECE 1384, Computer Engineering 4 (level 2); and ECE 1351, Topics in IC Design and ECE 1230, VLSI Design Lab (level 2).

Part-Time Evening Curriculum for Bachelor of Science in Mechanical Engineering

Third and Fourth Years		ENG 1340, Writing Workshop; MIM 1212, Probabilistic Analysis for Engineers; MIM 1240, Materials Science; MIM 1250, Engineering Mechanics; MIM 1280, Thermodynamics 1; MIM 1300, Measurements and Analysis; MIM 1355, Strength of Materials 1; MIM 1356, Strength of Materials 2; MIM 1360, Dynamics; MIM 1370, Heat Transfer; MIM 1375 Fluid Mechanics; MIM 1380, Thermodynamics 2; and MTH 1230, Linear Algebra for Engineers.
Fifth and Sixth Years		ECE 1171, Electrical Engineering 1; MIM 1215, Engineering Economy; MIM 1387, Thermal Design; MIM 1400, Mechanical Engineering Computation and Interpretation; MIM 1450, Mechanical Design; MIM 1455, Mechanical Vibrations; MIM 1501, MIM 1502, Design Project 1 and 2; one materials elective; and two technical electives.
	Summer Quarters	During the summer quarters students are expected to take ENG 1110, College Writing 1; ENG 1111, College Writing 2; ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; four adviser-approved social science/humanities electives, and one technical elective.

School of Engineering Technology

Gerard Voland, PhD, *Interim Director*
Roy Dalsheim, MEd, *Assistant Director*
Rasma Galins, *Assistant Director*

Professor
Samuel Fine, MD
Electrical Engineering Technology

Associate Professors
William E. Cole, PhD
Mechanical Engineering Technology
Eric W. Hansberry, MS
Design Graphics
George F. Kent, MS, MBA, PE
Mechanical Engineering Technology

Associate Academic Specialists
Vincent K. Butler, MS
Computer Technology
Leonard F. Dow, MS
Electrical Engineering Technology
Jerome Tapper, MS, PE
Electrical Engineering Technology

Lecturer
Joel R. Weinstein, BS
Computer Technology

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

Part-Time Evening and Weekend Programs

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617.373.2500 (voice), 617.373.8526 (TTY), or 617.373.2501 (FAX).

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.7
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, visit the School of Engineering Technology at 120 Snell Engineering Center.

Minor in Computer Technology

To qualify for a minor in computer technology, the student must complete the following six courses. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: CT 1311, Intermediate C++ Programming; CT 1330, Data Structures; CT 1345, Assembly Language; CT 1340, Software Engineering; CT 1381, Operating Systems; CT 1393, UNIX.

Minor in Electrical Engineering Technology

To qualify for a minor in electrical engineering technology, the student must complete the following five courses and three laboratories. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: EET 1151, Circuit Analysis 1; EET 1152, Circuit Analysis 2; EET 1324, Circuit Lab 1; EET 1325, Circuit Lab 2; EET 1311, Digital Electronics 1; EET 1312, Analog Electronics 1; EET 1323, Electronics Lab; EET 1330, Energy Conversion; *or* EET 1377, Control Engineering 1.

Minor in Mechanical Engineering Technology

To qualify for a minor in mechanical engineering technology, the student must complete the following seven courses and one laboratory. A student does not have to be enrolled in the School of Engineering Technology to declare the minor, but the student must meet the published prerequisites for all courses.

The required courses are: MET 1301, Mechanics A; MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1373, Fluid Mechanics; MET 1388, Measurements and Analysis; MET 1340, Thermodynamics A; MET 1380, Materials A; MET 1391, Tech Lab A.

To obtain credit for a minor in engineering technology, students must file a petition form with the School of Engineering Technology in 120 Snell Engineering Center. Interested students should confer with an adviser as soon as possible. The adviser is Mr. Roy Dalsheim, 120 Snell, 617.373.2500.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School or Embry Riddle, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets. See pages 253–255 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, College Writing 1; GET 1105, Computer Applications for Tech; and MTH 1194, Calculus 2.
Quarter 2	ENG 1111, College Writing 2; GET 1170, Engineering Graphics 1; PHY 1191, Physics for BSET 1; PHY 1196, Physics BSET Laboratory 1; and one liberal arts elective.

Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1195, Calculus 3; PHY 1192, Physics for BSET 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	EET 1320, Electricity and Electronics 1; GET 1104, Introduction to Product Design; MET 1301, Mechanics A; PHY 1198, Physics BSET Laboratory 3; and one liberal arts elective.
Quarter 5	MET 1302, Mechanics B; MET 1314, Stress Analysis A; MET 1373, Fluid Mechanics; and one liberal arts elective.
Quarter 6	ENG 1125, Technical Writing; MET 1340, Thermodynamics A; MET 1380, Mechanical A; and MET 1388, Measurement and Analysis.
Quarter 7	MET 1333, Design Lab; MET 1381, Mechanical Design B; one technical elective; and two liberal arts electives.

Computer Technology

Vincent K. Butler, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for technical inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams. See pages 249–251 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, College Writing 1; GET 1001, Critical Thinking; GET 1102, Engineering Technology and Design; GET 1105, Computers Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, College Writing 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1196, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	CT 1150, Computer Organization; GET 1100, Introductory C++ Programming; MTH 1194, Calculus 2; PHY 1193, Physics for BSET 3; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	CT 1311, Intermediate C++ Programming; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1195, Calculus 3.
Quarter 6	CT 1330, Data Structures; CT 1335, Numerical Methods; EET 1152, Circuit Analysis 2; and EET 1311, Digital Electronics 1.
Quarter 7	CT 1340, Software Engineering Design; CT 1381, Operating Systems; ENG 1125, Technical Writing; and one liberal arts elective.
Quarter 8	CT 1345, Assembly Language; CT 1346, Assembly Language Lab; CT 1374, Introduction to CPU Hardware; CT 1380, Data Communications; and one liberal arts elective.

Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1369, Computer Logic; CT 1370, Computer Laboratory 1; CT 1375, CPU Architecture; and CT 1480, Local Area Networks 1.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; CT 1371, Computer Laboratory 2; one technical elective; and one liberal arts elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; CT 1372, Computer Laboratory 3; one technical elective; and one liberal arts elective.

Electrical Engineering Technology

Leonard F. Dow, MS, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat-loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers. See pages 251–253 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, College Writing 1; GET 1001, Critical Thinking; GET 1102, Engineering Technology and Design; GET 1105, Computer Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, College Writing 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1196, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics for BSET 2; and PHY 1197, Physics BSET Laboratory 2.
Quarter 4	EET 1151, Circuit Analysis 1; GET 1100, Introductory C++ Programming; MTH 1194, Calculus 2; PHY 1193, Physics for BSET 3; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	EET 1152, Circuit Analysis 2; EET 1324, Circuits Laboratory 1; MET 1319, Mechanics; MTH 1195, Calculus 3; and one liberal arts elective.
Quarter 6	EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1312, Analog Electronics 1; EET 1325, Circuit Laboratory 2; and EET 1360, Engineering Analysis.
Quarter 7	EET 1313, Analog Electronics 2; EET 1314, Digital Electronics 2; EET 1323, Electronics Lab; EET 1354, Circuit Analysis 4; and ENG 1125, Technical Writing.
Quarter 8	EET 1310, Electrical Measurements; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one liberal arts elective.
Quarter 9	ECN 1115, Principles of Macroeconomics; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one liberal arts elective.
Quarter 10	EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; one technical elective; and one liberal arts elective.
Quarter 11	EET 1329, Advanced Electronics Laboratory 3; EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; and one liberal arts elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers. See pages 253–255 for course descriptions.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, College Writing 1; GET 1001, Critical Thinking; GET 1102, Engineering Technology and Design; GET 1105, Computer Applications for Tech; and MTH 1191, College Algebra.
Quarter 2	ENG 1111, College Writing 2; GET 1103, Freshman Seminar; GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1191, Physics for BSET 1; and PHY 1996, Physics BSET Laboratory 1.
Quarter 3	CMN 1115, Foundations of Communications; GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1192, Physics for BSET 2; and PHY 1997, Physics BSET Laboratory 2.
Quarter 4	EET 1320, Electricity and Electronics; GET 1104, Introduction to Product Design; MET 1301, Mechanics A; MTH 1194, Calculus 2; and PHY 1198, Physics BSET Laboratory 3.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1380, Materials A; and MTH 1195, Calculus 3.
Quarter 6	ENG 1125, Technical Writing; MET 1314, Stress Analysis A; MET 1340, Thermodynamics A; and MET 1388, Measurement and Analysis.
Quarter 7	ECN 1115, Principles of Macroeconomics; GET 1200, Visual Basics; MET 1303, Mechanics C; MET 1315, Stress Analysis B; and MET 1391, Technology Laboratory A.
Quarter 8	MET 1341, Thermodynamics B; MET 1393, Technology Laboratory C; MET 1396, Machine Shop; one technical elective; and one liberal arts elective.
Quarter 9	GET 1356, Engineering Economy; MET 1373, Fluid Mechanics; MET 1392, Technology Laboratory B; one technical elective; and one liberal arts elective.
Quarter 10	MET 1330, Mechanical Design A; MET 1343, Heat Transfer; one technical elective; and one liberal arts elective.
Quarter 11	MET 1331, Mechanical Design B; MET 1333, Design Lab; one liberal arts elective; and one open elective.

School of General Studies

The School of General Studies (SGS) is designed for students who need help in strengthening their basic skills while they take the required freshman-year coursework in English, mathematics, and social and laboratory sciences.

Through the combination of a prescribed curriculum, small classes, and low student-teacher ratio, students follow a program that fits their academic and career goals. SGS faculty provide advice and participate in a "House Plan" in which faculty members share information on each student's progress.

The school not only helps SGS students excel at college-level work, but also allows them to consider several different areas of study before selecting a major. Although the School of General Studies does not confer degrees, students *are* eligible to be accepted as sophomores into a wide variety of university degree-granting programs after the successful completion of their first year. Furthermore, SGS courses count toward graduation in a degree-granting program.

In preparation for gaining sophomore status, SGS students follow one of four curriculum tracks: arts and sciences *or* undecided, business, criminal justice, and health/science. Students may change their curriculum track through the winter quarter of the freshman year without falling behind.

Students have access to all physical education facilities and co-curricular programs, as well as to the SGS Peer Tutoring Program, the Academic Assistance Center, and the math and writing centers. As for all Northeastern students, the Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, SGS students must earn a quality-point average of 2.0 or higher and successfully complete a minimum of forty-four programmed credits, as well as required courses. The College of Business Administration requires that students earn at least a 1.8 in the four core courses: ECN 4601, ENG 4014, MGT 4110, and MTH 4040.

For entrance to the School of Nursing, College of Computer Science, and School of Engineering Technology, students complete a few additional science requirements during the freshman year. The Bouvé College of Health Sciences offers the following programs to students who have successfully completed the appropriate SGS curriculum: cardiopulmonary sciences, medical laboratory science, speech-language pathology and audiology, and toxicology. Students may also continue their degree programs in University College.

Tuition and Fees

Tuition and fees for the School of General Studies are the same as for students in the full-time day colleges.

Arts and Sciences or Undecided Track

Quarter 1	ED 4003, Integrated Language Skills, A; ENG 4013, Introductory Writing 1; MTH 4010, Mathematical Preliminaries 2*; and SOC 4010, Principles of Sociology 1 *or* HST 4110, History of Civilization A.
Quarter 2	ED 4004, Integrated Language Skills, B; ENG 4014, Introductory Writing 2; HST 4110, History of Civilization A *or* SOC 4010, Principles of Sociology 1; and MTH 4020, Functions and Algebra.*
Quarter 3	ED 4005, Integrated Language Skills Seminar; ENG 1111, College Writing 2; HST 4111, History of Civilization B; MTH 4030, Applications of Algebra*; and SOC 4011, Principles of Sociology 2; *or* an elective.

Business Track

Quarter 1	ED 4003, Integrated Language Skills, A; ENG 4013, Introductory Writing 1; HST 4110, History of Civilization A *or* ECN 4601, Economics 1; and MTH 4010, Mathematical Preliminaries 2.*
Quarter 2	ED 4004, Integrated Language Skills, B; ENG 4014, Introductory Writing 2; HST 4110, History of Civilization A *or* MGT 1115, Introduction to Business; and MTH 4020, Functions and Algebra.*
Quarter 3	ED 4005, Integrated Language Skills Seminar; ECN 4601, Economics 1; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 4040, College Mathematics for Business*; and ENG 1111, College Writing 2.

*In each curriculum, students will be placed in a mathematics course based on testing results.

Criminal Justice Track	Quarter 1	ED 4003, Integrated Language Skills, A; ENG 4013, Introductory Writing 1; MTH 4010, Mathematical Preliminaries 2*; and SOC 4010, Principles of Sociology 1 *or* HST 4110, History of Civilization A.
	Quarter 2	ED 4004, Integrated Language Skills, B; ENG 4014, Introductory Writing 2; HST 4110, History of Civilization A *or* SOC 4011, Principles of Sociology 2; and MTH 4020, Functions and Algebra.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; ENG 1111, College Writing 2; HST 4111, History of Civilization B; MTH 4030, Applications of Algebra*; and SOC 4011, Principles of Sociology 2 *or* an elective.
Health Sciences Track	Quarter 1	ED 4003, Integrated Language Skills, A; CHM 1110, General Chemistry Preliminaries; ENG 4013, Introductory Writing 1; and MTH 4010, Mathematical Preliminaries 2.*
	Quarter 2	ED 4004, Integrated Language Skills, B; CHM 1111, General Chemistry 1; ENG 4014, Introductory Writing 2; and MTH 4020, Functions and Algebra.*
	Quarter 3	ED 4005, Integrated Language Skills Seminar; BIO 1142, Basic Animal Biology 1; ENG 1111, College Writing 2; MTH 4030, Applications of Algebra*; and SOC 4010, Principles of Sociology 1.

Course Descriptions

Arts and Sciences

Please note that some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course overlaps with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 33.

African-American Studies

AFR 1100 Introduction to African-American Studies **4 QH**
Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and offers an opportunity to identify areas for more specific focus.

AFR 1121/ENG 1678 Early African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

AFR 1131/HST 1525 African-American History **4 QH**
Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. (Core Category III)

AFR 1132/HST 1526 African-American History Since 1900 **4 QH**
Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. *Prereq. AFR 1131 or permission of instructor.*

AFR 1133 History of Blacks in the Media and the Press **4 QH**
Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Educational Issues and Minority Communities **4 QH**
Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis looks at the historical development of these issues, and students are encouraged to think about and discuss the issues' future significance.

AFR 1151/ART 1218 African-American Art History **4 QH**
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America. (Core Category II)

AFR 1153/MUS 1104 Survey of African-American Music **4 QH**
Studies the impact of African rhythm on black music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties, bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included.

AFR 1155 Foundations of Black Culture **4 QH**
Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples. (Core Category V)

AFR 1156/MUS 1181 Music of Africa **4 QH**
Provides insight into the many and varied musical styles found on the continent of Africa. Examines instrumental and vocal traditions, using strategies and approaches appropriate to the study of music worldwide. Examines music from the perspective of its creators, as well as the roles and functions of the music in human life. Includes historical and contemporary musical genres.

AFR 1161/ECN 1170 Economic Issues in Minority Communities **4 QH**
Examines minority lifestyles, perspectives, self-images, and social position in the urban community, particularly in terms of the application of basic economic theories to the economic realities of minority communities. (Core Category VI)

AFR 1171 Contemporary Black Politics **4 QH**
Analyzes the evolution of black political thought in America and examines the sociopolitical contests that have served as catalysts to modern black political movements.

AFR 1191/HST 1620 Early African Civilization **4 QH**
Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, Nubia, Egypt, Ethiopia, and the Congo Kingdom.

AFR 1193 Africa Today **4 QH**
Studies the complex political and social picture of Africa. This course examines some of the salient features of black art, politics, and identity in Africa.

AFR 1195 Identity and Nationalism in Africa **4 QH**
Studies how centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry between factions have affected the present identities and nationalist movements in Africa. This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean **4 QH**
Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus is the contemporary period, the course examines that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues are addressed.

AFR 1197/HST 1621 Modern African Civilization **4 QH**
Explores African history and culture from 1800 to the present era. Emphasis is placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. (Core Category IV)

AFR 1200/ART 1216 Survey of African Art **4 QH**
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critiques, discussions, fieldwork, and hands-on interaction with art objects.

AFR 1211 African-Americans in Science, Technology, and Medicine **4 QH**
Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1220 The Black Novel **4 QH**
Focuses on the black novelist's place in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1231/LIN 1231 African-American English **4 QH**
Addresses topics in the study of African-American English or Ebonics. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in schools.

AFR 1233/MUS 1265 Jazz Improvisation 1 **4 QH**
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

AFR 1234/MUS 1234 Jazz Ensemble **1 QH**
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American music. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

AFR 1235 Black History of Boston **4 QH**
Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society **4 QH**
Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience. (Core Category VI)

AFR 1241 The Black Family **4 QH**
Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America **4 QH**
Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1249 Black Community and Social Change **4 QH**
Explores the dynamic changes experienced by black communities in the United States since the Civil Rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social change in addressing the current search for policies and programs for community development.

AFR 1251 Survey of Black Theater and Drama **4 QH**
Focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance. (Same as THE 1118.)

AFR 1271/POL 1308 The Politics of Poverty **4 QH**
Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

AFR 1280/PSY 1280 Race and Social Identity **4 QH**
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction, and autobiographical narratives, as well as empirical research in the field of psychology.

AFR 1294 Third World Politics **4 QH**
Offers a comparative regional analysis of the political systems of Third World nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of Third World nations in the international community.

AFR 1297/HST 1605 Caribbean History **4 QH**
Analyzes the development of the Caribbean from slavery to the present. Focuses on the period 1918–1962 especially, and emphasizes historical analysis of the relationship of the Caribbean with the United States and black Americans.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study **4 QH each**
Offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member closely supervises the project and acts as adviser for the duration of the quarter.

AFR 1342/POL 1342 Government and Politics of Africa **4 QH**
Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. (Core Category VI)

AFR 1355 Advanced Seminar **4 QH**
Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. The senior thesis is required of all African-American Studies majors. *Satisfies experiential education requirement. Prereq. Permission of instructor.*

AFR 1380 Junior/Senior Honors Program **4 QH**
For details contact the honors office.

AFR 1401 History of East Africa **4 QH**
Deals with the precolonial period and the problems of the partition of Africa in the first section of the course. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403/HST 1623 History of West Africa **4 QH**
Studies the history of West Africa and its struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa.

AFR 1405/HST 1625 History of South Africa **4 QH**
Studies precolonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neocolonialism, liberation movements, and international involvement in the apartheid system. (Core Category VI) *Prereq. AFR 1491 or permission of instructor.*

AFR 1415/LIN 1415 African Language **4 QH**
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.

AFR 1421 Modern African-American Literature **4 QH**
Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq. AFR 1127 or permission of instructor.*

AFR 1451/MUS 1112 Jazz **4 QH**
Examines the evolution of the creative improvisational musical styles commonly called jazz, from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audiovisual presentations. Also considers the sociocultural dynamics that have affected musical evolution and acceptance.

AFR 1470 Black Political Thought **4 QH**
Examines black opinions, from the radical to the ultraconservative, of the United States political system. The focus is historical in context and addresses notions of political socialization and the development of black political ideologies.

AFR 1575/PSY 1575 Community Psychology Laboratory **4 QH**
Students reflect upon real-world obstacles in conducting independent field research in communities in and around Northeastern during the quarter. Student reflections are used to guide research design, to evaluate theory, and to problem-solve social problems. Research topics may focus on battered women, HIV, student stress, perceptions of the media, church involvement in dealing with stress, or topics affecting large minority populations. Evaluates student performance through class discussions and written research reports.

AFR 1628/HST 1628 The African Diaspora **4 QH**
Explores the creation and transformation of the African Diaspora—connections among communities of African descent in Africa, the Americas, Europe, and Asia. Focuses on the years from 1500 to the present, and emphasizes connections among the themes of migration, identity, and popular culture.

AFR 1810, 1811,1812,1813 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

AFR 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy

PHL 1140 Social and Political Philosophy

PHL 1243 Existentialism

PHL 1335 Moral Philosophy

POL 1303 Political Behavior

POL 1362 Civil Liberties

POL 1386 International Law

SOA 1345 People in Cities

SOC 1147 Urban Social Problems

SOC 1170 Race and Ethnic Relations

SOC 1310 Class, Power, and Social Change

American Sign Language–English Interpreting

ASL 1101 American Sign Language 1 **4 QH**
Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, non-manual aspects of ASL, introductory fingerspelling, and some cultural features of the Deaf community.

ASL 1102 American Sign Language 2 **4 QH**
Continues basic language and culture study. Offers an opportunity to build receptive and expressive ASL vocabulary. Topics include the use of signing space; and further use of non-manual components, including facial expression and body postures. *Prereq. ASL 1101 or permission of instructor.*

ASL 1201 Intermediate American Sign Language 1 **4 QH**
Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the Deaf community. *Prereq. ASL 1102 or permission of instructor.*

ASL 1202 Intermediate American Sign Language 2 **4 QH**
Offers intensive practice involving expressive and receptive skills in storytelling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq. ASL 1201 or permission of instructor.*

ASL 1211 Deaf Culture **4 QH**
Focuses on the status of Deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the Deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the Deaf community. *Prereq. ASL 1201 or permission of instructor.*

ASL 1212 Deaf History **4 QH**
Surveys the history of Deaf people in the Western world, with emphasis on the American Deaf community, their language, education, and relationship to hearing society.

ASL 1220 Deaf People in Society **4 QH**
Focuses on Deaf Communities as linguistic and cultural minorities. Topics include: perspectives on Deaf Communities, attitudes toward Deaf people and Sign Languages, technology and communication, the contributions of Deaf people to society, professional and social organizations of and for Deaf people, Deaf clubs as a locus of Deaf culture, communication issues, perspectives on legislation affecting the Deaf Community, legislative and political concerns of the Deaf community, and the impact of educational options for Deaf children. (Core Category IV)

ASL 1250/LIN 1250 Linguistics of American Sign Language **4 QH**
Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq. ENG 1118 and the ability to follow lectures in ASL.*

ASL 1301 Advanced American Sign Language Proficiency **4 QH**
Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in Deaf culture, society, and current affairs. *Prereq. ASL 1202 or permission of instructor.*

ASL 1302 Advanced American Sign Language Proficiency 2 **4 QH**
Continues ASL 1301. *Prereq. ASL 1301 or permission of instructor.*

ASL 1401 American Sign Language Literature **4 QH**
Examines and discusses various genres of American Sign Language. This course concentrates on the work of current, recognized narrators in both literary and face-to-face storytelling traditions, and also includes selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet, Hotchkiss, and others. A videotaped research essay in ASL is required at the end of the course. *Prereq. ASL 1202 or permission of instructor.*

ASL 1500 Introduction to Interpreting **4 QH**
Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq. or concurrent: ASL 1505. Majors only or permission of instructor.*

ASL 1505 ASL–English Interpreting 1 **4 QH**
Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq. ASL 1302 with a grade of B or better. Majors only or permission of instructor.*

ASL 1506 ASL–English Interpreting 2 **4 QH**
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq. ASL 1505 with a grade of B or better. Majors only or permission of instructor.*

ASL 1507 ASL–English Interpreting 3 **4 QH**
Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq. ASL 1506 with a grade of B or better. Majors only or permission of instructor.*

ASL 1508 ASL–English Interpreting 4 **4 QH**
Continues the study of simultaneous and consecutive interpretation as they occur in specific discourse settings: medical, classroom, legal, employment, and social service. Focuses on discourse analysis in each setting and setting-specific application of the skills and techniques of simultaneous and consecutive interpretation. *Prereq. ASL 1507 with a grade of B or better. Majors only or permission of instructor.*

ASL 1520 Interpreter Role and Ethics **4 QH**
Explores ethical standards and dilemmas in ASL–English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq. ASL 1500. Majors only or permission of instructor.*

ASL 1521 Contrastive Analysis **4 QH**
Examines and contrasts the major linguistic features of ASL and English. The standard division of morphology, phonology, syntax, semantics, and register is reintroduced, and the various elements of both languages that fall under these divisions are compared point by point. *Permission of instructor.*

ASL 1522 Discourse Analysis for Interpreters **4 QH**
Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq. ASL 1250 and ASL 1302 or permission of instructor.*

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805 Directed Study **4 QH each**
Offers students an opportunity to go beyond coursework of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

ASL 1810 Special Topics in Interpreting **4 QH**
Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Population settings rotate and may include elderly, children, and foreign Deaf adults, as well as deaf-blind, multihandicapped, visual-gestural, educational, high-tech, and performing arts settings. *Prereq. ASL 1506. Majors only or permission of instructor. May be taken twice for credit.*

ASL 1820, 1821 Interpreting Practicum 1 and 2 **4 QH each**
Features practical interpreting experience in agencies serving Deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. This course fulfills the college's experiential education requirement for ASL majors. *Prereq. ASL 1507 and ASL 1520, both with a grade of B or better. Majors only or permission of instructor. May be taken twice for credit.*

ASL 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Anthropology

SOA 1100 Peoples and Cultures **4 QH**
Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1104/IAF 1104 Cultures of the World **4 QH**
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (Core Category II)

SOA 1125 Introduction to Archaeology **4 QH**
Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the farming communities of the Southwestern United States and Mississippi River area.

SOA 1133 The Americas from an Indigenous Perspective **4 QH**
Examines the history and culture of the Americas (North America, Mexico, Central America, South America, and the Caribbean) from the perspectives of its original inhabitants. Provide students with the understanding that history involves looking at not only the histories that we were never told, but also the ways in which the histories of the indigenous Americans were distorted and stereotyped. Examines the ways in which indigenous Americans are reclaiming their histories and culture in a variety of arenas and how the ways indigenous peoples have been encoded into history both influences how they are described in popular culture and textbooks and sets the tone for current issues such as territorial autonomy, political representation, control of native resources, and human rights that are fundamental in their communities. Developed through a collaborative process with indigenous students at Northeastern and elsewhere.

SOA 1146 Rural Workers in the Third World **4 QH**
Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (Core Category IV)

SOA 1155 Individual and Culture **4 QH**
Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family **4 QH**
Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression **4 QH**
Evaluates, by using anthropological investigations, the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness **4 QH**
Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1301 Human Origins **4 QH**
Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (Core Category II)

SOA 1303 Sexuality and Culture **4 QH**
Examines sexuality in a cross-cultural perspective, including issues of sexual identity, the relationship of sexuality to the life cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures **4 QH**
Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary Third World and postcolonial societies; examines local responses to those changes.

SOA 1425 Cultural Survival **4 QH**
Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development **4 QH**
Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (Core Category IV)

SOA 1431 Native North Americans **4 QH**
Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth **4 QH**
Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) **4 QH**
Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study **4 QH each**
Offers independent work on a chosen topic under the direction of members of the department. *Prereq. Senior standing and department approval.*

SOA 1820, SOA 1821, SOA 1822, SOA 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

SOA 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

SOA 3100 Theory **4 QH**
Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 **4 QH**
Introduces the history of painting, sculpture, architecture, and related arts through a study of masterpieces of Western art from prehistoric times to the end of the Middle Ages. Provides an opportunity for students to become familiar with specific works, styles, and terminology of art before 1400, and to develop an ability to communicate about the visual arts.

ART 1101 History of Art Since 1400 **4 QH**
Introduces the history of painting, sculpture, architecture, and related arts through a study of masterpieces of Western art from the end of the Middle Ages to the present. Offers students the opportunity to become familiar with specific works, styles, and terminology of art. Emphasizes communication about the visual arts.

ART 1106 Introduction to Art **4 QH**
Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (Core Category II)

ART 1111 Introduction to World Architecture 1 **4 QH**
Introduces selected examples of world architecture and urbanism. Emphasizes historic development of architecture, building types, stylistic characteristics, and relations between architectural works and the cultures that produce them. (Prehistoric to c. 1300)

Art 1112 Introduction to World Architecture 2 **4QH**
Introduces selected examples of world architecture and urbanism. Emphasizes historic development of architecture, building types, stylistic characteristics, and the relations between architectural works and the cultures that produce them. (c. 1300 to c. 1950)

ART 1124 Basic Drawing **4 QH**
Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.

ART 1127 Basic Painting **4 QH**
Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.

ART 1130 Visual Studies Foundation 1 **4 QH**
Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2 **4 QH**
Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms.

ART 1132 Principles of Graphics **4 QH**
Explores conceptual principles underlying the professional practice of design, including visual problem-solving processes, terminology, and methodology. Offers students the opportunity to learn to determine problem objectives, work to specifications, and investigate creative alternatives through lectures and critiques tied to assigned problems for which students are expected to present professionally crafted solutions. *Prereq. ART 1130 or permission of instructor.*

ART 1133 Graphic Design 1 **4 QH**
Applies graphic design principles to the correlation of forms with their function, content, and context. Explores a variety of media, including letterform photographic image-making and manipulation, and 3-D forms as elements of visual solutions. Exposes students to many forms of visual expression, including artists' books and moving images. *Prereq. ART 1132, ART 1134, and ART 1160.*

ART 1134 Typography 1 **4 QH**
Introduces letterforms in visual communication. Studies typography as form and explores visual principles affecting organization and access of typographic information. Introduces use of the typographic grid and issues of hierarchy and legibility through assigned projects, readings, and lectures. Includes exploration of the history, character, and potential application of a variety of typefaces. Lab fee. *Prereq. ART 1130 or permission of instructor.*

ART 1144 Typography 2 **4 QH**
Builds on the studies in ART 1134, shifting the focus from letterform to text type in a series of projects and exercises. Assignments increase in typographic complexity, bringing into play issues of structure, hierarchy, legibility, and readability in a variety of applications and media. Lab fee. *Prereq. ART 1134.*

ART 1150 Architectural Design 1 **4 QH**
Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of germinal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq. ART 1130, ART 1131, and ART 1156 or GE 1103.*

ART 1151 Architectural Design 2 **4 QH**
Introduces the idea of architectural language. Projects include analysis of a specific building by an important modern architect, the design of a single space within an existing structure, and a new building designed to coordinate with the original modern building. The studio focuses on composition, structure, materials, drawing, and craft. *Prereq. ART 1150 and ART 1354.*

ART 1156 Architectural Drafting **4 QH**
Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axonometric, one- and two-point perspective drawings. *Prereq. ART 1124 and ART 1130 or ART 1131.*

ART 1160 Introduction to Photography **4 QH**
Explores the basics of black-and-white photography. Introduces the 35-mm camera, manual exposure control, negative processing, and black-and-white printing in the department's state-of-the-art lab. *No previous photography experience required.* Lab fee.

ART 1170 Filmmaking Workshop **4 QH**
Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.

ART 1171 Animation Basics 4 QH
Offers an introductory studio course that explores the creative potential of animation. Exposes students to animation processes and techniques through lectures, demonstrations, and hands-on assignments. Provides a historical survey of animation art through the twentieth century. Emphasizes using the computer to creatively develop concepts while learning the fundamental skills of constructing animated images and forms. Lab fee. *Prereq. ART 1130.*

ART 1175 Animation Studio 1 4 QH
Provides intensive introduction to 3-D computer modeling and scene layout. Offers substantial hands-on explorations. Allows students to gain comprehensive skills for formal construction of organic and geometric models. Emphasizes creative development of virtual landscapes, structures, and characters. Cinematic principles provide the foundation for final composition of animated scenes. Lab fee. *Prereq. ART 1171.*

ART 1180 Video Basics 4 QH
Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided. *Prereq. ART 1130 and ART 1131 or permission of instructor.*

ART 1185 Still Digital Imaging 4 QH
Provides the introductory still digital imaging course in the multimedia studies program. Demonstrates and uses scanning, Adobe Photoshop, and outputting. Lab fee. *Prereq. ART 1160 or permission of instructor.*

ART 1190 Introduction to Computer Graphics 4 QH
Extends the study of visual problem-solving by introducing the computer as a tool for design and image-making. Weekly classes and labs in the Electronic Studios allow investigation into the medium's potential, limitations, and relationship to other media. Issues of sequencing, transformation, and motion through time and space are emphasized, with examination of their relevance to a broad spectrum of applications and disciplines. Lab fee. *Prereq. ART 1130 or permission of instructor.*

ART 1195 Intermediate Digital Photography 4 QH
Provides the second level digital photography courses in the multimedia studies program. Offers higher levels of course and lab work involving scanning, Adobe Photoshop, and outputting. Requires a final project for successful completion of the course. Lab fee. *Prereq. ART 1185.*

ART 1204 Renaissance Architecture 4 QH
Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.

ART 1205 Renaissance Art 4 QH
Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time. (Core Category III)

ART 1210 Nineteenth-Century Painting 4 QH
Explores art from 1780 to 1900. Considers developments such as neoclassicism, romanticism, realism, impressionism, and symbolism in terms of major changes in society: the city of Paris, industrialization, Transcendentalism, photography, Japonisme, the portrayal of women, and the Salons. Emphasizes French painting, but important developments in other European countries and America are considered. Museum visits included. (Core Category III)

ART 1213 Modern Art 4 QH
Examines the ideas and artists from the 1880s through the 1980s. Focuses on major developments in twentieth-century European and American painting, but also surveys sculpture, design, and related arts. Presents a thematic approach, exploring abstraction, expressionism, surrealism, utopian ideas of pure form, modernism, and postmodernism. Museum visits included. *Prereq. ART 1101 or permission of instructor.*

ART 1216/AFR 1200 Survey of African Art 4 QH
Traces the historical development of African art from traditional to contemporary styles and periods. Emphasizes the study of art objects, the social and historical context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critique, discussions, fieldwork, and hands-on interaction with art objects.

ART 1218/AFR 1151 African-American Art History 4 QH
Offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

ART 1219 Women in Art 4 QH
Examines the role of women in art as creators, subjects, and patrons, and the issues surrounding art, gender, and sexuality. Concentrates on three distinct periods: early modernism through Surrealism; the Renaissance; and contemporary culture. Requires interviewing an area artist and presenting individual projects. (Core Category VI)

ART 1220 American Art 4 QH
Offers a broad survey of the history of American painting and sculpture from the seventeenth century to the present. Explores the social and cultural forces as well as the aesthetic and intellectual concerns that shape the evolution of art in America. Includes frequent visits to the Museum of Fine Arts and the Gardner Museum. (Core Category III)

ART 1223 American Architecture 4 QH
Offers an introduction to the history, theory, and criticism of American architecture and urban planning from the mid-1600s to the 1930s. Explores the social and cultural forces that shape the built environment. Examines European influences as well as uniquely American contributions. Emphasizes the work of Louis Sullivan, H. H. Richardson, and Frank Lloyd Wright. (Core Category III)

ART 1225 Modern Architecture: The Nineteenth Century 4 QH
Surveys the development of modern architecture in the United States and Europe from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design in the context of their cultural responses to society's changing conditions. Includes field trips. *A previous course in art or architectural history is recommended.*

ART 1226 Modern Architecture: The Twentieth Century **4 QH**
Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American postmodernism and deconstruction. Includes field trips. *A previous course in art or architectural history is recommended.*

ART 1229 American House Architecture **4 QH**
Examines the architecture of American houses from first settlements of European colonists in the sixteenth century to issues in the 1900s. Aims to uncover the ways that architecture, seen through the lens of a particular building type, responds to the demands of materials, climate and geography, ethnic traditions, artistic expression, and changing societal forms.

ART 1230 History of Photography **4 QH**
Explores photography from its origins in 1839 to its maturity after World War II. Examines technological advances, the documentary aesthetic, art photography, and theoretical approaches to the study of the medium. Photographs are studied as art objects, personal statements, and historical artifacts. Museum visits included.

ART 1233 Contemporary Directions in Photography **4 QH**
Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.

ART 1235 History of Film **4 QH**
Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

ART 1236 American Film **4 QH**
Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.

ART 1237 Contemporary Directions in Cinema **4 QH**
Provides a comparative study of major international film movements from World War II to the present. Studies selected films by representative contemporary directors. Includes lectures, screenings, and discussions.

ART 1240 History of Graphic Design **4 QH**
Provides an understanding of the development of graphic design, focusing primarily on the events of the twentieth century that gave rise to the profession and influenced its maturation. Encourages students to interpret the ideas behind the historical record through lectures, readings, discussions, and projects. Considers the context, theories, and issues of graphic design's continuing evolution while exploring the moral and ethical aspect of the designer's role in shaping mass communication. *Prereq. ART 1101.*

ART 1243 Graphic Design 2 **4 QH**
Investigates the range of conceptual possibilities inherent in the merging of words/text with images/symbols through the understanding of how their relationship can enhance meaning and comprehension. Explores visual poetry, choices in mark and form, and applied semiotics through projects, readings, and lecture/discussion. Lab fee. *Prereq. ART 1133, ART 1250, and ART 1354.*

ART 1244 Graphic Design 3 **4 QH**
Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. Lab fee. *Prereq. ART 1190 and ART 1243. Junior or senior art majors only.*

ART 1250 Color Theory and Practice **4 QH**
Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.

ART 1252 Architectural Design 3 **4 QH**
Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq. ART 1151.*

ART 1253 Architectural Design 4 **4 QH**
Introduces the study of urban design. Students learn to analyze the structures and ordering systems of both historical and contemporary cities. Projects include urban analysis (frequently focusing on the Boston area) and proposed solutions. This studio addresses the problems associated with designing at several different scales at one time. *Prereq. ART 1252.*

ART 1254 Intermediate Drawing **4 QH**
Focuses on heightening the student's understanding of spatial awareness, scale, movement, and expression. Students are asked to create unusual environmental situations for their figurative compositions. A variety of media are used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq. ART 1124 or equivalent.*

ART 1256 Theory of Structures 1 **4 QH**
Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq. PHY 1222.*

ART 1257 Theory of Structures 2 **4 QH**
Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading, and materials in relation to the design of foundation, structural steel, reinforced concrete, timber frame, space frame, and shell systems. *Prereq. ART 1256.*

ART 1261 Intermediate Black-and-White Photography **4 QH**
Emphasizes combining personal aesthetic choices with work to refine photographic skills. A second-level black-and-white photography studio/lab course. The zone system for roll-film cameras, toners, fiber-based papers, and alternative film choices are demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq. ART 1160 or permission of instructor. Junior or senior art majors only.*

ART 1263 Introduction to Color Photography **4 QH**
Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in photography and contemporary color photographic processes. Working with color negative films, students get hands-on experience with the RA-4 color print process. Assignments emphasize solving technical and aesthetic problems inherent in color negative materials and include weekly lab sessions. Color chemistry and facilities are provided. Lab fee. *Prereq. ART 1160.*

ART 1264 Color Photography 2 **4 QH**
Allows students to explore and develop their personal photographic style, with an emphasis on experimentation. A second-level color course. Studies historical perspective of color photography contrasted with contemporary color work. Offers students the opportunity to develop the necessary foundation for critical analysis of their own work through required reading. Includes weekly assignments and critiques. Students develop a cohesive portfolio of photographs. Lab fee. *Prereq. ART 1261 and ART 1263.*

ART 1280 Media Graphics **4 QH**
An intermediate computer-based course in creating moving images. Time-based sequencing and characteristics of motion and transformation are explored in a series of digital projects and lab workshops. Projects increase in length and complexity, and may have a basis in instructional or information design, entertainment, or artistic exploration. Analogies between digital moving image and other time-based arts are explored through assignments, lectures, demonstrations, and visits to professional studios. Introduces interactivity and multiple media. Lab fee. *Prereq. ART 1133, ART 1180, and ART 1190.*

ART 1281 Video Project **4 QH**
Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq. ART 1180 or equivalent.*

ART 1285 Interarts **4 QH**
Introduces nontraditional art concepts in an intensive studio course. Includes categories of performance art, installation art, electronic art, multimedia and kinetic art. Using their own frames of reference and experience, students contribute to a collaborative project and are responsible for keeping a journal that will help them formulate their ideas. Students reflect upon their co-ops, internships, and other art-related experiences in a written essay that accompanies their final product. *Arts and Sciences experiential education option.*

ART 1290 Electronic Publishing Design **4 QH**
Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. Lab fee. *Prereq. ART 1133, ART 1134, and ART 1190. Junior and senior art majors only.*

ART 1291 Computer Graphics Workshop **4 QH**
Builds on the visual and technical experience of ART 1190 in a sequence of applied projects integrating word and image. Emphasizes imaginative and effective use of digital input and output devices, in conjunction with conventional media, to develop unexpected visual language. Portions of weekly classes are conducted as collaborative workshops and supported by labs, with students encouraged to interact with each other to enhance technical, problem-solving, and effective critiquing skills. Lab fee. *Prereq. ART 1144, ART 1190, and ART 1243. Senior art majors only.*

ART 1295 Computer-Aided Design **4 QH**
Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications. Lab fee.

ART 1296 Advanced Studio in Computer Visualization **4 QH**
Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis. Lab fee. *Prereq. ART 1295.*

ART 1305 Alternative Photographic Processes **4 QH**
Provides students with an intensive introduction to a variety of nonsilver photographic processes. Lab fee. *Prereq. Minimum of three photography courses, including ART 1261.*

ART 1310 Seminar in Modern Architecture **4 QH**
Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism, postmodernism, and deconstruction. Focuses on the work and ideas of such architects as Le Corbusier, Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Peter Eisenman, Frank Gehry, and Rem Koolhaas. *Prereq. ART 1226 or permission of instructor.*

ART 1324 Thesis in Art History **4 QH**
Focuses on the production of a 20–30 page thesis. Students undertake individual research, under the direction of a faculty member, on art-historical topics appropriate to their personal and professional interests. Conceived for art majors who are completing the BA degree and whose primary interest is in art history. *Arts and Sciences experiential education option for general art/art history. Prereq. ART 1100, ART 1101, 20 QH in other art history courses, departmental permission.*

ART 1330 Advanced Visual Communication **4 QH**
Presents an advanced seminar whose development sequence mirrors that of complex professional design projects. Extends a single applied project in phases through an entire term. Central to the course is a substantive written problem definition and program development integrating academic and applied design experience. Lab fee. *Arts and Sciences experiential education requirement for media arts and design majors. Prereq. ART 1144, ART 1244, and ART 1280. Senior art majors only.*

ART 1341 Architectural Design 5 **6 QH**
Introduces the issues of "tectonics," or the logic and order of assembling a building's parts. Looks at the different characteristics of materials and how they can be combined to achieve different effects. Students work on a single project throughout the term, focusing first on the specific connections of building parts and moving later to the general order of the project. *Prereq. ART 1253.*

ART 1342 Architectural Design 6 **6 QH**
Requires students to integrate previously acquired knowledge in the resolution of a specific building program for a specific site. Provides students with the opportunity to investigate the relationship between the different aspects of design and how it leads to the resolution of architectural forms. Incorporates the issues of context, tectonics, and typology into the design of a single building. *Prereq. ART 1341.*

ART 1352 Architectural Thesis 1 **6 QH**
One of two final studio courses. Provides an opportunity for students to investigate different sites around Boston, and to synthesize knowledge from previous design studios, history and technical courses, as well as various co-op work experiences. Students are expected to develop design strategies through drawings, models, and writings toward the creation of a well-developed architectural project. *Arts and Sciences experiential education requirement for architecture. Prereq. ART 1150–1151, ART 1252–1253, ART 1341, and ART 1342.*

ART 1353 Architectural Thesis 2 **6 QH**
The second part of the capstone course in studio architecture, following upon Architectural Thesis 1. Provides an opportunity for students to research a site and define the terms of their design solution. Students are expected to develop a complete architectural proposal in writing, drawing, and model form. *Prereq. ART 1352.*

ART 1354 Portfolio Review **1 QH**
Requires students to prepare and submit a portfolio of work completed in their required studio foundation courses and the first studios of their concentration areas. Offered as a pass/fail course and acts as a filter for more advanced courses and is a prerequisite for all upper-level studio courses. *Prereq. 36 QH in ART courses including ART 1124, ART 1130, ART 1131, and specific courses according to concentration.*

ART 1355 Environmental Systems **4 QH**
Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq. ART 1252 or permission of instructor.*

ART 1363 Advanced Photography Seminar **4 QH**
Requires that students refine their technical skills, master the 4 × 5 inch view camera (supplied), and make meaningful decisions about their relationship to the world around them through the use of black-and-white and/or color photography. The capstone course to the Photography Program, this course stresses individual direction and a qualitative approach to substantive photography. Lab fee. *Arts and Sciences experiential education requirement for photography concentration. Prereq. Permission of instructor. Junior or senior art majors only.*

ART 1713 Modern Art (Honors) **4 QH**
Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq. Honors status or permission of instructor.*

ART 1800, ART 1801, ART 1802 Directed Study **4 QH each**
Offers independent work under the direction of members of the department on a chosen topic. *Prereq. Junior and senior art major or department approval.*

ART 1803, ART 1804, ART 1805 Directed Study **6 QH each**
Offers independent work under the direction of members of the department on a chosen topic. *Prereq. Junior and senior art major or department approval.*

ART 1810, ART 1811, ART 1812, ART 1813 **4 QH each**
Junior/Senior Honors Program
For details, contact the honors office.

ART 1814 Directed Study **1 QH**
Offers independent work under the direction of members of the department on a chosen topic.

ART 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

ART 1899 Advanced Television Production **4 QH**
Provides students the opportunity to produce a half-hour television show for air on Cable Vision of Boston. Students are responsible for creating, shooting, and editing the show, as well as assembling necessary cast and crew. Students should have a fundamental knowledge of both videotape shooting and editing. *Prereq. ART 1180 and ART 1281 or permission of instructor.*

ART 1900, 1901, 1902 Directed Study **4 QH each**
Offers independent work under the direction of members of the department on a chosen topic in graphic design or photography. Lab fee.

Biology

Courses are presented in three categories: nonscience majors; health-related science and other nonbiology science majors; and biology majors. Two or more courses with substantially the same content may not be counted toward quantitative graduation requirements. If a student is not sure whether particular courses overlap it is his/her responsibility to get advice from a departmental adviser.

The following courses are primarily for nonscience majors. These courses are not open to biology majors.

BIO 1111 Environment and Man **4 QH**
Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. (Core Category II)

BIO 1171 Focus on the Sea: Issues and Nature **2 QH**
Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1174 Introduction to Marine Biology **3 QH**
Offers a broad introduction to the field, emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. Taken concurrently with BIO 1675 lab.

BIO 1182 The Human Organism **4 QH**
Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Taken concurrently with BIO 1683 lab.

BIO 1187 Biology of Human Reproduction **4 QH**
Studies sexual and reproductive function in the human male and female, including sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually transmitted disease. Analyzes factors affecting reproduction and sexuality in human populations.

BIO 1675 Introduction to Marine Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1174. Lab fee.

BIO 1683 Human Organism Lab **1 QH**
Laboratory taken concurrently with BIO 1182. Lab fee.

The following courses are primarily for majors in science- or health-related professions. These courses, where indicated, are not open to biology majors.

BIO 1108 General Biology **4 QH**
Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. Taken concurrently with BIO 1608 lab. (Overlaps BIO 1100 and BIO 1142).

BIO 1109 Animal Biology **4 QH**
Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Taken concurrently with BIO 1609 lab. (Overlaps BIO 1101 and BIO 1143.) *Prereq. BIO 1108 and BIO 1608.*

BIO 1122 Basic Microbiology **4 QH**
Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Taken concurrently with BIO 1622 lab. (Overlaps BIO 1323.) *Not open to biology majors.*

BIO 1142 Basic Animal Biology 1 **4 QH**
Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. Taken concurrently with BIO 1642 lab. (Overlaps BIO 1100 and BIO 1108.)

BIO 1143 Basic Animal Biology 2 **4 QH**
Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Taken concurrently with BIO 1643 lab. (Overlaps BIO 1101 and BIO 1109.) *Prereq. BIO 1142 and BIO 1642.*

BIO 1160 Functional Human Anatomy and Physiology 1 **4 QH**
Covers cell and tissue structure and function, anatomical terminology, and the anatomy and physiology of bones, muscles, and the nervous system. Taken concurrently with BIO 1650 lab. (Overlaps BIO 1162.) *Not open to biology majors.*

BIO 1161 Functional Human Anatomy and Physiology 2 **4 QH**
Covers anatomy and physiology of the respiratory, digestive, urogenital, endocrine, and cardiovascular systems, and a brief exploration of the anatomy and physiology of the eye and ear. Taken concurrently with BIO 1651 lab. (Overlaps BIO 1163 and BIO 1164.) *Prereq. BIO 1160 and BIO 1650; not open to biology majors.*

BIO 1162 Integrated Human Anatomy and Physiology 1 **4 QH**
Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physiology of skin, bones, muscles, and blood. Taken concurrently with BIO 1652 lab. (Overlaps BIO 1160.) *Not open to biology majors.*

BIO 1163 Integrated Human Anatomy and Physiology 2 **4 QH**
Presents the structure and function of the following systems: nervous, endocrine, and reproductive. Taken concurrently with BIO 1653 lab. (Overlaps BIO 1161.) *Prereq. BIO 1162 and BIO 1652; not open to biology majors.*

BIO 1164 Integrated Human Anatomy and Physiology 3 **4 QH**
Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Taken concurrently with BIO 1654 lab. (Overlaps BIO 1161.) *Prereq. BIO 1163 and BIO 1653; not open to biology majors.*

BIO 1608 General Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1108. Lab fee.

BIO 1609 Animal Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1109. Lab fee.

BIO 1622 Basic Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1122. Lab fee.

BIO 1642 Basic Animal Biology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1142. Lab fee.

BIO 1643 Basic Animal Biology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1143. Lab fee.

BIO 1650 Functional Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1160. Lab includes the study of human bones and muscles, pig dissection, and muscle and nerve physiology. Lab fee.

BIO 1651 Functional Human Anatomy and Physiology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1161. Lab includes studies of sensory physiology, enzymes, metabolism, and cardiovascular, respiratory, and urinary function. Lab fee.

BIO 1652 Integrated Human Anatomy and Physiology 1 Lab **1 QH**
Laboratory taken concurrently with BIO 1162. Lab includes pig dissection. Lab fee.

BIO 1653 Integrated Human Anatomy and Physiology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1163. Lab includes pig dissection. Lab fee.

BIO 1654 Integrated Human Anatomy and Physiology 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1164. Lab includes pig dissection. Lab fee.

The following courses are primarily for biology majors but are open to other students with appropriate prerequisites and permission of the instructor.

BIO 1100 Principles of Biology 1 **4 QH**
Introduces basic biological principles. Topics include: the first human retrovirus; the nature of scientific thought and knowledge; launching the antibiotic era; diabetes and the discovery of insulin; the cellular pathway of insulin secretion; DNA science; the principles of inheritance, and others. Integrates topics into discussions of disease and pathological processes and how fundamental biological principles form the foundation of medical science. Taken concurrently with BIO 1600 lab.

BIO 1101 Principles of Biology 2 **4 QH**
Introduces the diversity of animals through presentation of their systematic relationships, comparative structure and function, and ecological roles. Cellular, tissue, and organismal levels are included. Taken concurrently with BIO 1601 lab. *Prereq. BIO 1100 and BIO 1600.*

BIO 1102 Principles of Biology 3 **4 QH**
Examines the biology and diversity of plants and plantlike organisms. Explores the relationships between humans and plants by looking at plants through three different perspectives: 1) Feeding a Starving World; 2) Curing a Sick World; and 3) Engineering a Better World. Employs case studies to highlight major themes. Taken concurrently with BIO 1602 lab. *Prereq. BIO 1100 and BIO 1600.*

BIO 1170 Marine Biology **4 QH**
Presents the important physical, chemical, and geological properties of the ocean. Focuses on life in the marine environment as well as the structure and function of marine ecosystems. Includes the study of human interactions with the sea, such as the acquisition of marine resources, human impacts, and marine biotechnology. *Prereq. BIO 1100 and BIO 1101.*

BIO 1222 Environmental and Population Biology **4 QH**
Considers physical and chemical factors of the environment as they affect the distribution of organisms and as they may in turn be affected by the organisms. Includes population dynamics, species interactions, population genetics (lightly), the development of communities, and the structure and function of ecosystems. Taken concurrently with BIO 1611 lab. *Prereq. BIO 1100–1102, BIO 1600–1602, and CHM 1111.*

BIO 1270 Diving Research Methods **4 QH**
Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population census-taking methods, underwater measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq. Scuba certification.*

BIO 1282 Genetics **4 QH**
Focuses on classical and molecular approaches to understanding heredity. Topics include Mendelian genetics, linkage, recombination, gene mapping, chromosomal genetics, molecular genetics, recombinant DNA methods, gene regulation, and developmental genetics. Taken concurrently with BIO 1660 lab. *Prereq. BIO 1100–1102, BIO 1600–1602.*

BIO 1283 Introductory Biochemistry **4 QH**
Topics include structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways. Taken concurrently with BIO 1661 lab. *Prereq. BIO 1282 and BIO 1660, CHM 1221, and CHM 1265.*

BIO 1317 Marine Ecology **4 QH**
Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through fieldwork the Pacific Northwest intertidal and shallow subtidal communities. East/West program, Friday Harbor. Taken concurrently with BIO 1613 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1321 Evolution **4 QH**
Presents and discusses the mechanisms of evolution, with emphasis on lines of evidence, modes of speciation, and current topics. Taken concurrently with BIO 1621 lab. *Prereq. BIO 1222, BIO 1611, and BIO 1282, BIO 1660.*

BIO 1323 General Microbiology **4 QH**
Introduces morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1122.) Taken concurrently with BIO 1623 lab. *Prereq. BIO 1100–1102, BIO 1600–1602 or BIO 1102, BIO 1602, and BIO 1108–1109, BIO 1608–1609; CHM 1111, and CHM 1122.*

BIO 1333 Marine Botany **4 QH**
Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Taken concurrently with BIO 1630 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1334 Molecular Marine Botany **4 QH**
Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Students are expected to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Taken concurrently with BIO 1644 lab. *Prereq. BIO 1333 and BIO 1630.*

BIO 1343 Vertebrate Zoology **4 QH**
Presents systematics, behavior, ecology, and zoogeography of all classes of vertebrates. Taken concurrently with BIO 1641 lab. *Prereq. BIO 1101, BIO 1601, or BIO 1222 and BIO 1611.*

BIO 1344 Biology of Crustacea **4 QH**
Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. Taken concurrently with BIO 1645 lab. *Prereq. BIO 1373 or GEO 1428 or permission of instructor.*

BIO 1346 Embryology **4 QH**
Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Lab work emphasizes the frog, chick, and pig. Taken concurrently with BIO 1646 lab. *Prereq. BIO 1282, BIO 1660.*

BIO 1349 Animal Histology **4 QH**
Offers microscopic study of fundamental types of animal tissues. Taken concurrently with BIO 1648 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609.*

BIO 1355 Regulatory Cell Physiology **4 QH**
Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical messengers and regulators, and principles of cellular contraction and motility. Taken concurrently with BIO 1655 lab. *Prereq. BIO 1101 and BIO 1601.*

BIO 1356 Comparative Vertebrate Anatomy **4 QH**
Examines the morphology and phylogeny of the vertebrates. Taken concurrently with BIO 1656 lab. *Prereq. BIO 1101 and BIO 1601.*

BIO 1373 Marine Invertebrate Zoology **4 QH**
Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Taken concurrently with BIO 1673 lab. *Prereq. BIO 1101 and BIO 1601.*

BIO 1381, BIO 1382, BIO 1383, BIO 1384 Marine Biology Project **1–4 QH**
Provides students with the opportunity to participate in marine research in conjunction with faculty at Northeastern University's Marine Science Center in Nahant or at other marine institutions. Students are expected to devise, design, and implement experiments that are based in one of several core subject areas in marine biology, including marine ecology, biotechnology, and aquaculture. *Prereq. BIO 1170 and a biology elective.*

BIO 1387 The Biology of Corals **4 QH**
Concentrates on tropical crudaria; studies the systematics, anatomy, physiology, and ecology of this group of animals that assume such an important role in tropical marine ecosystems. East/West Program, Jamaica. Taken concurrently with BIO 1687 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1403 Histologic Technique **4 QH**
Discusses general methods of tissue preparation for purposes of microscopic study. Taken concurrently with BIO 1603 lab. *Prereq. BIO 1102 and BIO 1602.*

BIO 1413 Tropical Terrestrial Ecosystems **3 QH**
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq. BIO 1222 and BIO 1611.*

BIO 1414 Benthic Marine Ecology **4 QH**
Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory are applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Taken concurrently with BIO 1612 lab. *Prereq. BIO 1222 and BIO 1611, BIO 1373 and BIO 1673.*

BIO 1416 Microbial Physiology **4 QH**
Focuses on prokaryotic diversity, including differing types of metabolic activity, evolution, systematics, and taxonomy. Discusses the *Archaea* and eukaryotic microorganisms. Taken concurrently with BIO 1616 lab. *Prereq. BIO 1323 and BIO 1623 or equivalent.*

BIO 1417 Experimental Design in Marine Ecology **4 QH**
Provides the tools necessary for the proper design of ecological experiments and their analysis. Focuses on experimental designs tailored for analysis of variance (ANOVA). Topics include hypothesis testing, creating and identifying proper levels of replication, data transformations, and multiple comparisons. *Prereq. BIO 1222 and BIO 1611, BIO 1283 and BIO 1661.*

BIO 1418 Marine Microbial Ecology **4 QH**
Examines the diversity of marine microorganisms and recent advances in the area of microbial ecology. Emphasizes the structure and function of microbial food webs in marine communities. Taken concurrently with BIO 1615 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1419 Plant Physiology **4 QH**
Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral metabolism and nutrition, photosynthesis, hormones, growth, and development are included. Taken concurrently with BIO 1629 lab. *Prereq. BIO 1102, BIO 1602, and CHM 1265.*

BIO 1426 Medical Microbiology **4 QH**
Emphasizes host-parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Taken concurrently with BIO 1626 lab. *Prereq. BIO 1323 and BIO 1623 or equivalent.*

BIO 1433 Lower Plants **4 QH**
Examines the morphology, ultrastructure, ecology, life cycles, and reproductive strategies of nonvascular plants. Taken concurrently with BIO 1633 lab. *Prereq. BIO 1102 and BIO 1602, BIO 1222 and BIO 1611.*

BIO 1434 Higher Plants **4 QH**
Studies the origin and evolution of land plants since their invasion of the land surface in late Silurian and early Devonian times, approximately 405 to 370 million years ago; compares early and modern land plants and discusses their evolution; examines the flower as a reproductive structure. Taken concurrently with BIO 1634 lab. *Prereq. BIO 1102 and BIO 1602, BIO 1222 and BIO 1611.*

BIO 1435 Plant Development **4 QH**
Examines the structural and molecular aspects of plant development beginning with the fertilization apparatus of higher plants and the development of the embryonic plant. Studies the structure and development of the vegetative and reproductive organs of the plant. Applies the advances in the fields of cellular and molecular biology to the interpretation of plant development. Students progress from learning fundamental information on each topic through reading contemporary research papers. Student projects will be the focus of the laboratory. Taken concurrently with BIO 1635 lab. *Prereq. BIO 1102 and BIO 1602, BIO 1222 and BIO 1611.*

BIO 1442 Vertebrate Paleontology **4 QH**
Examines evolution of the vertebrates, including humans, as revealed through the fossil record. *Prereq. BIO 1101, BIO 1601, and BIO 1222, BIO 1611 and BIO 1282, BIO 1660; or permission of instructor.*

BIO 1450 Immunology **4 QH**
Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq. BIO 1283 or BIO 1461 and BIO 1467. BIO 1467 may be taken concurrently.*

BIO 1452 Comparative Neurobiology **4 QH**
Presents a cellular approach to structure and function of the nervous system. Topics include neuronal anatomy, cellular properties of single neurons, synaptic transmission, integration in nerve cells, nerve networks, sensory systems, motor systems, sensory-motor integration, specification of neuronal connectivity, and phylogeny of nervous systems. *Prereq. General (animal) physiology.*

BIO 1455 Advanced Invertebrate Zoology **4 QH**
Concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Taken concurrently with BIO 1662 lab. *Prereq. BIO 1373 and BIO 1673.*

BIO 1456 Parasitology **4 QH**
Examines the symbiotic relationships of parasitic protozoans, flatworms, nematodes, and arthropods. Taken concurrently with BIO 1663 lab. *Prereq. BIO 1101, BIO 1601, BIO 1282, and BIO 1660.*

BIO 1458 Wildlife Biology **4 QH**
Presents concepts and techniques utilized in the conservation and study of wild vertebrates. Subjects include habitat management, endangered species, exotic species, zoonoses, financing, and legislation. Taken concurrently with BIO 1658 lab. *Prereq. BIO 1222, BIO 1611 and either BIO 1459 and BIO 1659 or BIO 1468 and BIO 1668.*

BIO 1459 Ornithology **4 QH**
Examines anatomy, physiology, behavior, ecology, zoogeography, paleontology, and systematics of birds of the world. Taken concurrently with BIO 1659 lab. *Prereq. BIO 1222, BIO 1611.*

BIO 1460 Current Concepts in Cell Biology **4 QH**
Examines selected topics in cellular structure and function of eukaryotes, for example, compartmentalization and its underlying physical and biochemical processes. Topics will vary. Lab fee. *Prereq. BIO 1282, BIO 1660, and CHM 1265.*

BIO 1461 General Biochemistry **4 QH**
Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, nucleotides, and amino acids. *Prereq. BIO 1282, BIO 1660, and CHM 1265. May be taken concurrently with BIO 1462.*

BIO 1462 General Biochemistry Laboratory **4 QH**
Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two lab periods and one lecture per week. Lab fee. *Prereq. BIO 1283 or BIO 1461. BIO 1461 may be taken concurrently.*

BIO 1463 Cellular Biochemistry **4 QH**
Emphasizes the structure and function of organelles, mechanisms of signal transduction, and regulation of gene expression. *Prereq. BIO 1461 and BIO 1467.*

BIO 1464 Marine Birds and Mammals **4 QH**
Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. Taken concurrently with BIO 1669 lab. *Prereq. BIO 1222, BIO 1611 and BIO 1343, BIO 1643.*

BIO 1467 Molecular Biology **4 QH**
Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Emphasizes experimental design and proof in macromolecular chemistry and genetics. *Prereq. BIO 1283, BIO 1661, or BIO 1461. May be taken concurrently with BIO 1450.*

BIO 1468 Mammalogy **4 QH**
Examines anatomy, physiology, behavior, ecology, zoogeography, paleontology, and systematics of mammals of the world. Taken concurrently with BIO 1668 lab. *Prereq. BIO 1101, BIO 1601 or BIO 1109, BIO 1609, and BIO 1222, BIO 1611.*

BIO 1473 Systems Physiology **4 QH**
Covers function and regulation of major physiological systems in animals including energy metabolism, thermoregulation, muscle and movement, circulation, respiration, salt and water balance, and circadian rhythms. Emphasizes vertebrates but material on invertebrates will be included where appropriate. Taken concurrently with BIO 1677 lab. *Prereq. BIO 1283, BIO 1661 or BIO 1355, BIO 1655, or permission of instructor.*

BIO 1474 Neuroethology **4 QH**
Concentrates on the mechanisms underlying behavior of model invertebrates and lower invertebrates in a lecture, field, and lab course. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Taken concurrently with BIO 1674 lab. *Prereq. BIO 1283 and BIO 1661.*

BIO 1476 Herpetology **4 QH**
Emphasizes the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Mandatory field trips. Taken concurrently with BIO 1676 lab. *Prereq. BIO 1282, BIO 1660.*

BIO 1480 Senior Biochemistry Seminar **1 QH**
Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq. BIO 1283 and BIO 1661.*

BIO 1481 Ocean and Coastal Processes 1 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. The first of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Friday Harbor. Taken concurrently with BIO 1680 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1482 Ocean and Coastal Processes 2 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. The second of a series of three courses intended to introduce the student to a wide range of coastal environments. East/West Program, Jamaica. Taken concurrently with BIO 1681 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1483 Ocean and Coastal Processes 3 **4 QH**
Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles through comparative studies. The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Offered at Marine Science Center in Nahant. Taken concurrently with BIO 1682 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1485 Biology and Ecology of Fish **4 QH**
Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Taken concurrently with BIO 1685 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1486 Environmental Microbiology **4 QH**
Studies the microbial environment and ecology of the cell. Explores interactions between microbial populations, stressing soil and fresh-water associations. Taken concurrently with BIO 1686 lab. *Prereq. BIO 1323 and BIO 1623.*

BIO 1489 Adaptations of Aquatic Organisms **4 QH**
Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. Taken concurrently with BIO 1689 lab. *Prereq. BIO 1222 and BIO 1611.*

BIO 1491, BIO 1492 Directed Study 1, 2 **2 QH each**
Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq. BIO 1283 and BIO 1661.*

BIO 1494 Capstone in Biology **4 QH**
Integrates and assesses the concepts and skills obtained from the entire biology curriculum, including both experiential and classroom-based components. Requires extensive reflection by students on their various educational experiences as well as written summaries of these reflections, library and internet research of scientific questions related to the experiences, and preparation of presentations of this research (e.g., oral, poster, and/or Web site). All phases are accompanied by class discussion and critique. Required for biology majors and can be used to fulfill the experiential education requirement. *Prereq. 80 QH and at least one approved experiential activity; e.g., 4 QH of laboratory- or field-oriented directed study or at least one co-op quarter.*

BIO 1495, BIO 1496, BIO 1497, BIO 1498 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

BIO 1600 Principles of Biology 1 Lab **1 QH**
Laboratory involves demonstrations and hands-on practice of the concepts discussed in lecture. Laboratory taken concurrently with BIO 1100. Lab fee.

BIO 1601 Principles of Biology 2 Lab **1 QH**
Laboratory taken concurrently with BIO 1101. Lab fee.

BIO 1602 Principles of Biology 3 Lab **1 QH**
Laboratory taken concurrently with BIO 1102. Lab fee.

BIO 1603 Histological Technique Lab **1 QH**
Laboratory taken concurrently with BIO 1403. Lab fee.

BIO 1611 Environmental and Population Biology Lab **1 QH**
Laboratory taken concurrently with BIO 1222. Lab fee.

BIO 1612 Benthic Marine Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1414. Lab fee.

BIO 1613 Marine Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1317. Lab fee.

BIO 1615 Marine Microbial Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1418. Lab fee.

BIO 1616 Microbial Physiology Lab **1 QH**
Laboratory taken concurrently with BIO 1416. Lab fee.

BIO 1617 Experimental Design in Marine Ecology Lab **1 QH**
Laboratory taken concurrently with BIO 1417. Illustrates principles of design and analysis with several short- and long-term experiments conducted in the rocky intertidal zone. Lab fee. *Prereq. BIO 1222 and BIO 1611, and BIO 1283 and BIO 1661.*

BIO 1621 Evolution Lab **1 QH**
Laboratory taken concurrently with BIO 1321. Laboratory involves students in library research.

BIO 1623 General Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1323. Lab fee.

BIO 1626 Medical Microbiology Lab **1 QH**
Laboratory taken concurrently with BIO 1426. Lab fee.

BIO 1629 Plant Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1419. Lab fee.

BIO 1630 Marine Botany Lab 1 QH
Laboratory taken concurrently with BIO 1333. Lab fee.

BIO 1633 Lower Plants Lab 1 QH
Laboratory taken concurrently with BIO 1433. Lab fee.

BIO 1634 Higher Plants Lab 1 QH
Laboratory taken concurrently with BIO 1434. Lab fee.

BIO 1635 Plant Development Lab 1 QH
Laboratory taken concurrently with BIO 1435. Student projects will be the focus of the laboratory. Lab fee.

BIO 1641 Vertebrate Zoology Lab 1 QH
Laboratory taken concurrently with BIO 1343. Laboratories consist of study of vertebrate specimens and field trips to observe species in their habitats. Lab fee.

BIO 1644 Molecular Marine Botany Lab 1 QH
Laboratory taken concurrently with BIO 1334. Students are expected to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee.

BIO 1645 Biology of Crustacea Lab 1 QH
Laboratory taken concurrently with BIO 1344. Lab fee.

BIO 1646 Embryology Lab 1 QH
Laboratory taken concurrently with BIO 1346. Lab work emphasizes the frog, chick, and pig. Lab fee.

BIO 1648 Animal Histology Lab 1 QH
Laboratory taken concurrently with BIO 1349. Lab fee.

BIO 1655 Regulatory Cell Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1355. Lab fee.

BIO 1656 Comparative Vertebrate Anatomy Lab 1 QH
Laboratory taken concurrently with BIO 1356. Lab work consists of the dissection of the shark, mud puppy, and cat. Lab fee.

BIO 1658 Wildlife Biology Lab 1 QH
Laboratory taken concurrently with BIO 1458. Lab fee.

BIO 1659 Ornithology Lab 1 QH
Laboratory taken concurrently with BIO 1459. Lab fee.

BIO 1660 Genetics Lab 1 QH
Laboratory taken concurrently with BIO 1282. Laboratory includes work with *Drosophila*, fungi, bacteria, and DNA plasmids. Lab fee.

BIO 1661 Introductory Biochemistry Lab 1 QH
Laboratory taken concurrently with BIO 1283. Lab fee.

BIO 1662 Advanced Invertebrate Zoology Lab 1 QH
Laboratory taken concurrently with BIO 1455. Lab fee.

BIO 1663 Parasitology Lab 1 QH
Laboratory taken concurrently with BIO 1456. Lab fee.

BIO 1668 Mammalogy Lab 1 QH
Laboratory taken concurrently with BIO 1468. Laboratories involve study of specimens, field collection, and museum preparation, including a weekend field trip. Lab fee.

BIO 1669 Marine Birds and Mammals Lab 1 QH
Laboratory taken concurrently with BIO 1464. Labs include identifying, dissecting, and preparing specimens that occur along the New England coast. Lab fee.

BIO 1673 Marine Invertebrate Zoology Lab 1 QH
Laboratory taken concurrently with BIO 1373. Lab emphasizes living marine forms, with dissection of representative organisms. Lab fee.

BIO 1674 Neuroethology Lab 1 QH
Laboratory taken concurrently with BIO 1474. Lab fee.

BIO 1677 Systems Physiology Lab 1 QH
Laboratory taken concurrently with BIO 1473. Lab fee.

BIO 1680 Ocean and Coastal Processes 1 Lab 1 QH
Laboratory taken concurrently with BIO 1481. Lab fee.

BIO 1681 Ocean and Coastal Processes 2 Lab 1 QH
Laboratory taken concurrently with BIO 1482. Lab fee.

BIO 1682 Ocean and Coastal Processes 3 Lab 1 QH
Laboratory taken concurrently with BIO 1483. Lab fee.

BIO 1685 Biology and Ecology of Fish Lab 1 QH
Laboratory taken concurrently with BIO 1485. Lab fee.

BIO 1686 Environmental Microbiology Lab 1 QH
Laboratory taken concurrently with BIO 1486. Lab fee.

BIO 1687 Biology of Corals Lab 1 QH
Laboratory taken concurrently with BIO 1387. Lab fee.

BIO 1689 Adaptations of Aquatic Organisms Lab 1 QH
Laboratory taken concurrently with BIO 1489. Lab fee.

BIO 1888, 1889 Experiential Education Directed Study 4 QH each
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Chemistry

Introductory Chemistry Courses

CHM 1105 General Chemistry for the Health Sciences 1 5 QH
Examines topics in inorganic chemistry relevant to students in the health sciences. Topics include atomic structure; energy changes in physical and chemical processes; stoichiometry; chemical bonding; gases, liquids, and solids; solutions; acids and bases; equilibrium; and kinetics. Topics are related to molecular processes in the human body. Lab fee.

CHM 1106 General Chemistry for the Health Sciences 2 **5 QH**
Introduces organic chemistry and organic substances of biological significance. Covers structure and reactivity of alkanes, alkenes, alkynes, aromatic compounds, oxygen-containing compounds (alcohols, aldehydes, ketones, esters, ethers, and carboxylic acids), sulfur-containing compounds (thiols and sulfides), nitrogen-containing compounds (amines and amides), carbohydrates, proteins, lipids, and nucleic acids. Biological chemistry includes the study of enzymes, vitamins, metabolic pathways, and body fluids. Lab fee. *Prereq. CHM 1105.*

CHM 1107 Basic Chemistry for the Nursing Professional **5 QH**
A survey course beginning with descriptions of atoms and molecules and ending with an understanding of the relationships between the structures and functions of drugs, metabolites, proteins, polysaccharides, nucleic acids, and other important biomolecules. Emphasizes throughout the visualization of chemical compounds and molecules as a means of describing their properties. Lab fee.

CHM 1111 General Chemistry for the Life Sciences 1 **5 QH**
Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (Core Category II)

CHM 1122 General Chemistry for the Life Sciences 2B **5 QH**
For nonchemistry majors who will be taking CHM 1264. Covers chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq. CHM 1111.*

CHM 1130 Fundamentals of Chemistry **4 QH**
Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students 1 **4 QH**
Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2 **4 QH**
Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical transformations. *Prereq. CHM 1131.*

CHM 1138 General Chemistry Laboratory **1 QH**
Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1 **5 QH**
For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2 **5 QH**
Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq. CHM 1111 or CHM 1151.*

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry **4 QH**
For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq. CHM 1122 or equivalent.*

CHM 1231 Analytical Chemistry for Majors **5 QH**
For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq. CHM 1152 or equivalent.*

CHM 1264 Organic Chemistry for Biology Science Majors 1 **5 QH**
For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq. CHM 1122, CHM 1152, or equivalent.*

CHM 1265 Organic Chemistry for Biology Science Majors 2 **5 QH**
Continues CHM 1264. Lab fee. *Prereq. CHM 1264.*

CHM 1271 Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 1 **3 QH**
For chemistry and biochemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq. CHM 1152 or CHM 1132, and CHM 1138 or equivalent.*

CHM 1272 Organic Chemistry for Chemistry and Biochemistry Majors and Chemical Engineering Students 2 **5 QH**
Continues CHM 1271. Lab fee. *Prereq. CHM 1271.*

CHM 1274 Organic Chemistry 3: The Organic Chemistry of Living Process **5 QH**
Examines advanced functional group chemistry, especially as relevant to molecules of nature. Studies polycarbonyl compounds, phenols, carbohydrates, lipids, terpenoids and steroids, amino acids and peptides, alkaloids, nucleic acids, and antibiotics and hormones. Lab fee. *Prereq. CHM 1272 or equivalent.*

CHM 1381 Physical Chemistry 1 **3 QH**
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq. CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equivalent; PHY 1223, PHY 1233, or equivalent.*

CHM 1382 Physical Chemistry 2 **3 QH**
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanisms. *Prereq. CHM 1381.*

CHM 1383 Physical Chemistry 3 **3 QH**
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq. CHM 1382.*

CHM 1394 Experimental Physical Chemistry 1 **2 QH**
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq. CHM 1381 or taken concurrently.*

CHM 1395 Experimental Physical Chemistry 2 **2 QH**
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq. CHM 1382 or taken concurrently.*

CHM 1396 Experimental Physical Chemistry 3 **2 QH**
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq. CHM 1383 or taken concurrently.*

CHM 1422 Instrumental Methods of Analysis **4 QH**
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in non-optical spectroscopy. *Prereq. CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.*

CHM 1432 Instrumental Analysis Laboratory **2 QH**
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.

CHM 1441 Inorganic Chemistry **4 QH**
Presents the following topics: basic concepts of molecular topologies, coordination compounds, coordination chemistry, isomerism, electron-transfer reactions, substitution reactions, molecular rearrangements and reactions at ligands, and biochemical applications. *Prereq. CHM 1383.*

CHM 1461 Identification of Organic Compounds **3 QH**
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq. CHM 1265 or CHM 1274.*

CHM 1491, CHM 1492 Directed Study **2 QH each**
Offers independent work under the direction of a faculty member. *Prereq. An organic chemistry sequence and analytical chemistry and departmental approval.*

CHM 1521 Advanced Analytical Chemistry 1 **3 QH**
Examines analytical separations. Corresponds to graduate course CHM 3511. *Prereq. CHM 1422 or equivalent.*

CHM 1523 Advanced Analytical Chemistry 2 **3 QH**
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3514. *Prereq. CHM 1422 or equivalent.*

CHM 1525 Advanced Analytical Chemistry 3 **3 QH**
Covers optical methods of analysis. Corresponds to CHM 3513. *Prereq. CHM 1422 or equivalent.*

CHM 1561 Advanced Organic Chemistry 1 **3 QH**
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3566. *Prereq. CHM 1274 or CHM 1265.*

CHM 1562 Advanced Organic Chemistry 2 **3 QH**
Examines organic structure and reactions. Corresponds to graduate course CHM 3666. *Prereq. CHM 1561.*

CHM 1563 Advanced Organic Chemistry 3 **3 QH**
Focuses on organic structure and properties. Corresponds to graduate course CHM 3567. *Prereq. CHM 1274.*

CHM 1564 Spectrophotometric Identification of Organic Compounds **3 QH**
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3569. *Prereq. CHM 1274 or equivalent.*

CHM 1581 Advanced Physical Chemistry 1 **3 QH**
Examines chemical thermodynamics. Corresponds to graduate course CHM 3586. *Prereq. CHM 1382.*

CHM 1591 Advanced Physical Chemistry 2 **3 QH**
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3696. *Prereq. CHM 1383.*

CHM 1738 General Chemistry Laboratory (Honors) **1 QH**
Honors equivalent of CHM 1138. Lab fee.

CHM 1741 General Chemistry 1 (Honors) **4 QH**
Honors equivalent of CHM 1131.

CHM 1742 General Chemistry 2 (Honors) **4 QH**
Honors equivalent of CHM 1132.

CHM 1751 General Chemistry 1 (Honors) **5 QH**
Honors equivalent of CHM 1151. Lab fee.

CHM 1752 General Chemistry 2 (Honors) **5 QH**
Honors equivalent of CHM 1152. Lab fee.

CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research **4 QH each**
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. *Prereq. Middler standing or above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.*

CHM 1811 Advanced Chemical Laboratory Practice 1 **4 QH**
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. *Prereq. CHM 1274, CHM 1395, CHM 1396, CHM 1422, and departmental approval.*

CHM 1812 Advanced Chemical Laboratory Practice 2 **4 QH**
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. *Prereq. CHM 1811 and departmental approval.*

CHM 1840, CHM 1841, CHM 1842, CHM 1843 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

CHM 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Communication Studies

CMN 1110 Voice and Articulation **4 QH**
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

CMN 1111 Oral Interpretation of Literature **4 QH**
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.

CMN 1115 Foundations of Communications **4 QH**
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.

CMN 1116 Public Speaking **4 QH**
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.

CMN 1210 Advanced Voice and Articulation **4 QH**
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. *Prereq. CMN 1110.*

CMN 1211 Advanced Oral Interpretation **4 QH**
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. *Prereq. CMN 1111.*

CMN 1232 Communication and Gender **4 QH**
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such as "genderlect," gender bias in language, and gender images communicated in the media.

CMN 1239 Argumentation and Debate **4 QH**
Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. *Prereq. CMN 1116 or permission of instructor.*

CMN 1240 Advanced Studies in Speech Performance **4 QH**
Provides an opportunity to expand skills and strategies in public speaking and debate. Designed for students in the forensic program and for students wishing more in-depth study of public speaking and debate. Emphasizes development of competitively successful approaches to public speaking. *Prereq. CMN 1116 or CMN 1239 or permission of instructor.*

CMN 1250 Introduction to Mass Communication **4 QH**
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.

CMN 1300 Communication Theory **4 QH**
Surveys critical communication theories as applied to television. Topics include semiotics, narrative, genre, ideology, feminist theories, British cultural studies, and postmodernism.

CMN 1310 The Classical Age of Speech and Rhetoric **4 QH**
Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.

CMN 1315 Theories of Persuasion **4 QH**
Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.

CMN 1317 The Audience in Mass Communication **4 QH**
Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fanship, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq. CMN 1250.*

CMN 1318 Negotiation Skills **4 QH**
Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq. Middler standing or above or permission of instructor.*

CMN 1330 Interpersonal Communication **4 QH**
Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.

CMN 1331 Advanced Interpersonal Communication **4 QH**
Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq. CMN 1330.*

CMN 1338 Group Discussion **4 QH**
Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.

CMN 1410 Contemporary Public Address **4 QH**
Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.

CMN 1415 Persuasion in Contemporary Culture **4 QH**
Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq. CMN 1315 or permission of instructor.*

CMN 1430 Organizational Communication **4 QH**
Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization.

CMN 1431 Advanced Organizational Communication **4 QH**
Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations. *Prereq. CMN 1430.*

CMN 1437 Consultation Skills **4 QH**
Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case-study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. *Prereq. CMN 1115.*

CMN 1450 Television Studio Production **4 QH**
Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. *Prereq. CMN 1250 or permission of instructor.*

CMN 1451 Foundations of Electronic Media **4 QH**
Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.

CMN 1452 Radio Production **4 QH**
Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. *Prereq. CMN 1250 or permission of instructor.*

CMN 1453 Broadcast Management **4 QH**
Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. *Prereq. CMN 1250 and middler standing or above.*

CMN 1454 Programming for Radio and Television **4 QH**
Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television. *Prereq. CMN 1250.*

CMN 1455 Television Field Production **4 QH**
Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. *Prereq. CMN 1250 and CMN 1450.*

CMN 1500 Special Topics in Communication Studies **4 QH**
Examines various contemporary issues in communication studies. Course content to be posted in communication studies department prior to quarter in which it is offered. *Please consult department prior to registering.*

CMN 1554 Special Topics in Media **4 QH**
Examines various contemporary issues in mass media.

CMN 1555 Communication and the Quality of Life **4 QH**
Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. *Prereq. Middler standing, CMN 1330, or permission of instructor.*

CMN 1600 Introduction to Communication Research **4 QH**
Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research.

CMN 1610 Rhetorical Criticism **4 QH**
Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (Core Category V)

CMN 1620 Television Criticism **4 QH**
Offers an advanced communication course where students analyze and evaluate representations of race, class, gender, and the family in television discourse. Aims to increase awareness of the ways that the aural, visual, and aesthetic codes of television work to shape beliefs and values.

CMN 1650 Senior Seminar in Communications **4 QH**
Provides an in-depth review of the student's mastery of the curriculum. Includes a battery of assessment measures to allow students to demonstrate skills competencies in communication. Expects students to complete a research project designed to integrate the student's experiential education with the principles and skills learned in the classroom. *Prereq. Permission of instructor, majors only, and middler-year standing.*

CMN 1800, CMN 1801, CMN 1802, CMN 1803 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

CMN 1890, CMN 1891, CMN 1892 Directed Study **4 QH each**
Prereq. Permission of instructor.

CMN 1893 Directed Study **1 QH**
Prereq. Permission of instructor.

CMN 1894 Directed Study **2 QH**
Prereq. Permission of instructor.

CMN 1895 Internship in Speech Communication **4 QH**
Gives students the opportunity to gain hands-on experience in the communications industry. Requires approval by the internship director prior to registration. Further internship details are available in the department office. *Fulfills the College of Arts and Sciences experiential education requirement.*

CMN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

CMN 1899 Advanced Television Production
Provides students with guidance in the development of special projects in television and video production. Studies include advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and postproduction technology. Students involved in the Northeastern Student Network project may also receive credit. *Prereq. Permission of instructor.*

Economics

Courses ECN 1000–1199 are Pathway courses, for which there are no prerequisites. Courses ECN 1200–1299 are required courses with specified prerequisites. Courses ECN 1300–1499 are upper-level elective courses with specified prerequisites; exceptions to these may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives **4 QH**
Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. *Not recommended for students who have completed either ECN 1115 or ECN 1116.* (Core Category II) (Pathway)

ECN 1115 Principles of Macroeconomics **4 QH**
Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (Core Category II) (Pathway)

ECN 1116 Principles of Microeconomics **4 QH**
Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (Core Category II) (Pathway)

ECN 1130 Health Care and Medical Economics **4 QH**
Examines health-care trends in the United States; medical care expenditures; the impact of medical care on health, morbidity, and mortality; CPI and MCPI; the role of gatekeepers; markets for medical care, health insurance, physicians, and nurses; DRGs, HMOs, CONs; the politics of health care; national health insurance; extended-care facilities; life care plans; consumer responsibilities; "Date to be 100"; and health-care quality. (Pathway)

ECN 1140 Economics of Crime **4 QH**
Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies. (Core Category VI) (Pathway)

ECN 1150 Economics of World Energy and Primary Resources **4 QH**
Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. (Pathway)

ECN 1170 Economic Issues in Minority Communities **4 QH**
Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural materials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (Core Category VI) (Pathway)

ECN 1171 Women in the Labor Market **4 QH**
Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. (Pathway)

ECN 1180 Industrial Organization and Public Policy **4 QH**
Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).* (Pathway)

ECN 1181 Economics of Art and Culture **4 QH**
Presents an overview of the economic aspects of art and culture. Examines the production and consumption of art and culture and the role of the public and private sectors. Topics include: consumer demand, economic models of nonprofit cultural organization, competition and market structure in the arts, artists as members of the labor force, productivity issues in the performing arts, public support for the arts, and the role and impact of public and private subsidies. (Pathway)

ECN 1190/IAF 1190 The Global Economy **4 QH**
Introduces the history, structure, and growth of the international economy. Considers dimensions of global economic interdependence, including population, foreign investment, and environmental spillovers. Analyzes a few key economic issues of current importance for major regions of the world, such as economic integration in Western Europe or the emergence of the East Asian dragons. (Pathway)

ECN 1191/IAF 1330 Development Economics **4 QH**
Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development; the role of technological change; population; and foreign trade. (Core Category V) (Pathway)

ECN 1192 American Economic Development **4 QH**
Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes. (Pathway)

ECN 1193 European Economic Development **4 QH**
Discusses the economic inheritance of the nineteenth-century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquests and European integration; the future of less developed areas in southern Europe; environmental impact of industrialism and the implications of technological society. (Core Category III) (Pathway)

ECN 1215 Macroeconomic Theory **4 QH**
Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment, and growth in the light of recent economic history. *Prereq. ECN 1115 or two Pathway courses, and MTH 1114 or equivalent.*

ECN 1216 Microeconomic Theory **4 QH**
Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq. ECN 1116 or two Pathway courses, and MTH 1114 or equivalent.*

ECN 1220 History of Economic Thought **4 QH**
Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1250 Statistics **4 QH**
Discusses basic probability, descriptive statistics, estimation techniques, statistical hypotheses, sampling, analysis or variance, correlation, and regression analysis in the context of economics. Computer applications are an integral part of this course. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*

ECN 1260 Problems in Economic Research **4 QH**
Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1310 Labor Economics **4 QH**
Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq. ECN 1115 or ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1311 Employment and Training Programs and Policies **4 QH**
Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq. ECN 1115 or any three economics courses (excluding ECN 1250).*

ECN 1314 Economics of Education and Human Capital **4 QH**
Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education (preschool through postsecondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1315 Income Inequalities and Discrimination **4 QH**
Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq. ECN 1115 or ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1320 Urban Economics **4 QH**
Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land-use patterns. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1321 Urban Economic Problems and Policies **4 QH**
Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1322 Economics of Transportation **4 QH**
Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1323 Environmental Economics **4 QH**
Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1332 Economic History of Less Developed Countries **4 QH**
Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and strategies, state policies, and international economic relations. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250); ECN 1191 recommended.*

ECN 1334 Comparative Economics **4 QH**
Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1335 International Economics: Finance **4 QH**
Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements, and the international monetary system. *Prereq. ECN 1115, or any three economics courses (excluding ECN 1250), or permission of instructor.*

ECN 1336 International Economics: Trade **4 QH**
Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250) or permission of instructor.*

ECN 1340 Government Expenditures: Structure and Evaluation **4 QH**
Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq. ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1341 Financing of Government: Taxation and Debt **4 QH**
Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq. ECN 1116 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1342 Money and Banking **4 QH**
Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq. ECN 1115 or equivalent or any three economics courses (excluding ECN 1250).*

ECN 1345 Business Cycles and Inflation **4 QH**
Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1215.*

ECN 1350 Introduction to Econometrics **4 QH**
Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models, and elementary forecasting. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250), and ECN 1250.*

ECN 1353 Introduction to Mathematics for Economists **4 QH**
Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq. ECN 1115 and ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1360 Managerial Economics **4 QH**
Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1361 Social Control of Economic Activities **4 QH**
Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers. *Prereq. ECN 1116 or any three economics courses (excluding ECN 1250).*

ECN 1401 Advanced Economic Theory **4 QH**
Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq. ECN 1215 and ECN 1216.*

ECN 1415 Selected Topics in Macroeconomics **4 QH**
Studies macroeconomic issues. *Prereq. Permission of instructor.*

ECN 1416 Selected Topics in Microeconomics **4 QH**
Studies microeconomic issues. *Prereq. Permission of instructor.*

ECN 1470 Economics Is What Economists Do **1 QH**
Provides students with an understanding of what it is that economists do and what the future may hold for them. Consists of presentations by faculty on their research, by members of the Department of Cooperative Education on cooperative education employment opportunities, by representatives from Career Services and alumni of the Department of Economics on permanent employment opportunities and experiences, and by representatives of relevant graduate and professional schools for students to explore future educational opportunities. *Prereq. Nonfreshman status; economics major or minor.*

ECN 1481 Directed Study **1 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1482 Directed Study **2 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1483 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1484 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should only be used to fulfill economics electives. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq. Qualified senior economics majors and approval of department chair.*

ECN 1492 Senior Economics Seminar **4 QH**
Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq. ECN 1216 and ECN 1215; senior economics majors only.*

ECN 1495, ECN 1496, ECN 1497, ECN 1498 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

ECN 1715 Macroeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors) **4 QH**
Honors equivalent of ECN 1116.

ECN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Education

ED 1003 Reading/Study Skills 1 **4 QH**
Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2 **4 QH**
Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills **4 QH**
Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-tos of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Human Services and Social Science **4 QH**
Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Introduction to Education **4 QH**
Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Child Development, Learning, and Education **4 QH**
Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Adolescent Development, Learning, and Education **4 QH**
Presents a basic overview of the continuity of human development in contemporary society, from the preadolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Learning and the Teaching Process **4 QH**
Explores learning and teaching within different types of schools. Examines the pedagogical, environmental, and historical factors that affect the instructional processes and influence educational outcomes.

ED 1106 Creative Expression in Children **4 QH**
Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq. ED 1102.*

ED 1107 Beginning Computer Use in Education **4 QH**
Introduces students who are unfamiliar with software applications to computer use through general purpose software: word processing and data processing. Covers operating systems commands as well as concepts relating to computer hardware and software. Suggests methods of applying the computer to study requirements in college and to teaching.

ED 1302/HS 1101 The Human Services Professions **4 QH**
Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq. ED 1100, SOC 1100, or equivalent.*

ED 1309/HS 1219 Intervention Strategies for the Human Services **4 QH**
Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment **4 QH**
Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq. PSY 1111 or SOC 1100.*

ED 1319 Speech, Language, and Cognition in the Young Child **4 QH**
Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq. ED 1102.*

ED 1405 Teaching Children's Literature and the Arts **4 QH**
Offers a comprehensive survey of the field of children's literature and literature for young adults. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial children's books and, contemporary illustrators. Provides students with the opportunity to learn how to integrate language arts, visual arts, and music in the teaching of literature.

ED 1407 Integrating the School Curriculum through Social Studies **4 QH**
Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq. ED 1406.*

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1 **4 QH**
Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq. ED 1104.*

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2 **4 QH**
Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq. ED 1410.*

ED 1412 Fundamentals of Secondary School Curriculum Development **4 QH**
Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1417 Student Teaching Practicum and Seminar **8 QH**
A 300-clock-hour student practicum and related biweekly seminar. Allows for full-time participation in a University-arranged and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Arts and Sciences experiential education requirement. Prereq. Completion of sequence in education and minimum of 2.5 QPA.*

ED 1420 Student Teaching Practicum in the Pre-K Years **4 QH**
A 150-clock-hour student teaching practicum and related biweekly seminar. Offers extensive participation with supervision in a pre-K program. Students analyze learning and teaching and demonstrate, evaluate, and develop teaching skills while working with young children with diverse backgrounds and needs. *Arts and Sciences experiential education requirement. Prereq. Completion of advanced professional sequence in early childhood education and minimum 2.5 QPA.*

ED 1421 Curriculum for the Pre-K Years **4 QH**
Presents theories of active learning and learning through play as applied in the prekindergarten years. Offers students the opportunity to learn to specify goals in order to: facilitate children's growth, development, and achievement of skills in communication, inquiry, creative expression, and interpersonal relations; plan, implement, and evaluate content and methodology in various curriculum areas; incorporate developmentally appropriate, integrated learning experiences; select materials and create learning environments; and integrate children with special needs. *Prereq. ED 1102 and ED 1104.*

ED 1423 Multicultural Education **4 QH**
Reviews aspects of the history and culture of different ethnic groups to explore the manner in which certain themes and issues are manifested. Examines and evaluates ethnic and multicultural school curricula in relation to specific educational criteria and goals and their potential impact on learners. Requires students to select and organize historical, literary, and artifact materials from specific ethnic groups and to use them in the planning of learning experiences for classroom use.

ED 1425 Teaching Mathematics and Science to Children **4 QH**
Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education students. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Teaching the Language Arts **4 QH**
Emphasizes literacy development in the elementary grades. Presents an integrated language learning perspective drawn from recent research on language and literacy acquisition to serve as the basis for instructional methodology. Students are expected to build an understanding both of how children develop in language, reading, and writing, and of language structure that will enable them to make appropriate instructional decisions in the classroom.

ED 1470 Freshman Seminar **1 QH**
Continues work begun in ED 1101, Introduction to Education, in a series of seminars during the winter and spring quarters. Students prepare an educational plan and are introduced to a number of current educational issues.

ED 1480 Junior/Senior Seminar for Education Students **1 QH**
Examines career development and career management issues of teaching professionals. Discusses important components of the after-graduation job search process, and incorporates advice from professionals in the field. Examines a number of current issues relating to the working conditions of teachers, such as the teacher's union, teacher certification, graduate school, career issues for women, and alternative careers in education.

ED 1800 Directed Study 1 **4 QH**
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

ED 1801 Directed Study 2 **4 QH**
For students who have completed ED 1800.

ED 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013 and ENG 1111; ENG 1110 and ENG 1111. For the College of Engineering, ENG 1110 and ENG 1111, and for international students, ENG 1004, ENG 1005, and ENG 1006; or ENG 1005 and ENG 1006.

ENG 1004 Fundamentals of English-SOL **4 QH**
Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. Pass/fail grading. *Prereq. Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.*

ENG 1005 College Writing 1-SOL **4 QH**
Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq. ENG 1004 or special placement.*

ENG 1006 College Writing 2-SOL **4 QH**
Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq. ENG 1005 or equivalent.*

ENG 1013 Basic Writing **4 QH**
Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. Pass-fail grading. *Prereq. Special placement.*

ENG 1110 College Writing 1 4 QH
Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems.

ENG 1111 College Writing 2 4 QH
Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq. ENG 1110.*

ENG 1115 Poetry 4 QH
Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1116 Fiction 4 QH
Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1117 Drama 4 QH
Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (Core Category II) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1118/LIN 1118 Introduction to Language and Linguistics 4 QH
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (Core Category II)

ENG 1119/LIN 1119 History of the English Language 4 QH
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1120 Survey of English Literature 1 4 QH
Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1121 Survey of English Literature 2 4 QH
Surveys the major British writers and major literary movements from the Romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1123 Survey of American Literature 1 4 QH
Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1124 Survey of American Literature 2 4 QH
Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1125 Technical Writing 4 QH
Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals, and by making oral presentations. *Prereq. ENG 1110 and ENG 1111 and 80 QH.*

ENG 1126 Backgrounds in English and American Literature 4 QH
Examines in translation Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1218/LIN 1218 Introduction to Language and Linguistics 2 4 QH
A workshop that focuses on three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that underlie the linguistic system inside each language user's mind, with a slant toward "doing" linguistics: playing with data, analyzing it, and ultimately explaining it. *Prereq. ENG 1118/LIN 1118 or permission of instructor.*

ENG 1275 Grammar for Journalists 4 QH
Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. *Prereq. Journalism majors only.*

ENG 1276 Science Fiction 4 QH
Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1277 Topics in Science Fiction 4 QH
Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1278 Modern Bestseller 4 QH
Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1279 The Modern Novel **4 QH**
Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1280 Modern Drama **4 QH**
Studies the development of drama from realism to surrealism, from Ibsen to Beckett. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1281 The Modern Short Story **4 QH**
Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1283 Contemporary Fiction **4 QH**
Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, Morrison, Kingston, and Barth. Emphasizes experimental and modernist authors. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1285 Literature and the Law **4 QH**
Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1286 Literature and Politics **4 QH**
Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1287 The Literature of Science **4 QH**
Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings are drawn from historically significant scientific texts, literary texts, or some combination of these. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1288 Film and Text **4 QH**
Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era *(Catch-22, The Graduate). Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1289 Shakespeare on Film **4 QH**
Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1290 Topics in Film **4 QH**
Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1293 Topics in Popular Culture **4 QH**
Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1294 Modern Film **4 QH**
Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1300 Topics in Fiction **4 QH**
Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1307 Literary Interpretation **4 QH**
Introduces students to a variety of interpretive methods by studying literary works in different genres—poetry, fiction, and drama—in conjunction with critical texts. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1309 Topics in Literary Criticism **4 QH**
Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop **1 QH**
Emphasizes the writing process: multiple drafts, revision, editing, and publication. Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. *Prereq. 80 QH and Mechanical Engineering Technology majors or by petition.*

ENG 1350 Writing for the Professions **4 QH**
Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. Fulfills Middler-Year Writing Requirement. *Prereq. ENG 1110 and ENG 1111 and 80 QH.*

ENG 1351 Creative Writing **4 QH**
Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1352 Advanced Writing **4 QH**
Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq. ENG 1350 or permission of instructor.*

ENG 1357 Poetry Workshop **4 QH**
Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq. ENG 1351 or permission of instructor.*

ENG 1360 Writing Practicum **4 QH**
An upper-level writing course designed for transfer students who have had transfer credit accepted by Northeastern University, but whose performance on the Introductory Writing Program essay indicates that they would benefit from another course in writing. Taken for elective credit, focuses on reading and writing in an academic context. Requires students to write expository essays that allow them to rehearse a number of different writing strategies as they explore a single topic of their choice (in consultation with the instructor) for the entire term. Students are required to keep a portfolio of all their work (from notes to drafts to final essay), a reading notebook, and a grammar log.

ENG 1361 The Writing Process **4 QH**
Offers students training in the teaching of writing and reading in the professional literature of writing theory and instruction, under the guidance of the instructor. Students tutor in the Writing Center and/or other venues as part of their coursework. Ordinarily, students will spend one day a week meeting in class with the instructor, and the rest of their time working and meeting with the instructor outside the classroom. Requires a final paper reflecting on their experience as teachers of writing. *Fulfills the college's experiential education requirement for English majors.*

ENG 1362 Publication Arts **4 QH**
Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1370 Technical Writing 2 **4 QH**
Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq. ENG 1125 or permission of instructor.*

ENG 1371 Writing for the Computer Industry **4 QH**
Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq. ENG 1125 or permission of instructor and one computer science course.*

ENG 1380 Writing for the Health Professions **4 QH**
Provides an opportunity for students in the health services to develop a recommendation report that incorporates personal experience with academic critique. Students will be required to evaluate scholarly and popular journals in their fields. Includes workshop, editing, and peer review. *Mechanical Engineering Technology majors or by petition.*

ENG 1381 Writing for the Professions: Business Administration **4 QH**
Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. *Mechanical Engineering Technology majors or by petition. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1382 Writing for the Professions: Criminal Justice **4 QH**
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms. *Mechanical Engineering Technology majors or by petition. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1400 Topics in Genre **4 QH**
Explores the characteristics of a particular literary form over time through works by various authors. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1401/LIN 1401 Introduction to Syntax **4 QH**
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (Core Category V) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1402/LIN 1402 Grammars of English **4 QH**
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1407/LIN 1407 Introduction to Semantics **4 QH**
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture? *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1408/LIN 1408 Topics in Linguistics **4 QH**
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1409 American Novels 1 **4 QH**
Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Stowe, Melville, Twain, and James. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1410 American Novels 2 **4 QH**
Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1411 English Drama 1 **4 QH**
Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1412 English Drama 2 **4 QH**
Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1550 Psychology and Literature **4 QH**
Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Wolfe, Faulkner, Conrad, and Lawrence. Same as INT 1707.

ENG 1551 Gender Roles in Literature **4 QH**
Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1552 Fantasy **4 QH**
Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1557 Topics in Fantasy **4 QH**
Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1558, ENG 1559 Literature in Context **4 QH each**
Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the settlement of America. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1600, ENG 1601 Topics in Literature **4 QH each**
Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1602, ENG 1607 Major Figure **4 QH each**
Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1608 The City in Literature **4 QH**
Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1609 Contemporary American Literature **4 QH**
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1610 Early American Literature **4 QH**
Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1611 New England Renaissance **4 QH**
Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience. Includes such writers as Emerson and Thoreau, Hawthorne, Fuller, and Melville. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1612 American Realism **4 QH**
Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Harding, Davis, Howells, Crane, and Norris. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1615 Multiethnic Literature of the United States **4 QH**
Explores contemporary literature by and about writers from distinctive American ethnic groups (e.g., Native, Asian, African, Latino, Jewish, Italian, Arab). Features a variety of works that reflect an evolving recognition of the artistically and culturally diverse nature of American literature. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1617 Modern American Literature **4 QH**
Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1618 Children's Literature **4 QH**
Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland, Uncle Remus, Little Women,* and *The Wizard of Oz. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1619 Topics in Children's Literature **4 QH**
Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1621 Nineteenth-Century British Fiction **4 QH**
Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1622 Major Twentieth-Century British Novelists **4 QH**
Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1627 Medieval English Literature **4 QH**
Surveys the major works of medieval English literature. Includes works such as *Sir Gawain, Piers Plowman,* and *Pearl. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1628 Chaucer **4 QH**
Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1629 Topics in Chaucer **4 QH**
Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1630 Milton **4 QH**
Concentrates on Milton's *Paradise Lost,* with supplementary readings in his minor poetry and prose. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1631 Topics in Medieval Literature **4 QH**
Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1632 Sixteenth-Century Literature **4 QH**
Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1637 Seventeenth-Century English Literature **4 QH**
Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1639 Eighteenth-Century English Literature **4 QH**
Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1640 Topics in Eighteenth-Century Literature **4 QH**
Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1641 Romantic Poetry **4 QH**
Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (Core Category V) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1647 Victorian Literature **4 QH**
Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1648 Topics in Victorian Literature **4 QH**
Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence). *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1649 World Literature 1 **4 QH**
Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1650 World Literature 2 **4 QH**
Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1652 Twentieth-Century English Literature **4 QH**
Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1658 Introduction to Shakespeare **4 QH**
Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1659 Shakespeare's Comedies **4 QH**
Studies the romantic comedies, problem comedies, and romances, ranging from *The Merchant of Venice* to *The Tempest. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1660 Shakespeare's Tragedies **4 QH**
Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from *Julius Caesar* to *Coriolanus. Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1661 Topics in Shakespeare **4 QH**
Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1662 The Bible **4 QH**
Studies books of both the Old Testament and the New Testament as literature and as history. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1667 Modern Poetry **4 QH**
Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and cummings. (Core Category III) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1677 Contemporary Poetry **4 QH**
Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (Core Category VI) *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1678/AFR 1121 Early African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1679 Modern African-American Literature **4 QH**
Surveys the development and range of black American writers, emphasizing poetry and prose from the post–Civil War period to the present. *Prereq. ENG 1110 and ENG 1111 or equivalent.*

ENG 1690, ENG 1691 Junior/Senior Seminar **4 QH each**
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new feminism and the novel, or the canon and its revisions. Emphasizes independent research in a seminar setting. *Prereq. ENG 1110 and ENG 1111 or equivalent and junior/senior status.*

ENG 1692/LIN 1692, ENG 1693/LIN 1693
Junior/Senior Seminar in Linguistics **4 QH each**
Explores important topics in language and linguistics, such as style and meaning or language and gender. Emphasizes independent research in a seminar setting. *Prereq. ENG 1110 and ENG 1111 or equivalent and junior/senior status.*

ENG 1694 Topics in Experiential Education **4 QH**
Explores such topics as writing about place, writing about people, or reviewing and writing about culture. Combines class meetings, reading assignments, and individual meetings with the instructor, with learning experiences outside the classroom. *Fulfills the college's experiential education requirement for English majors. Prereq. ENG 1110 and ENG 1111 or equivalent and junior standing in the English major.*

ENG 1695 Internship Practicum **4 QH**
Offers students internships in such areas as publishing, education, or business and technical writing under the direction of a faculty member. Students are required to produce both a portfolio of professional work and a final paper reflecting on their internship experience. *Fulfills the college's experiential education requirement for English majors. Prereq. ENG 1110 and ENG 1111 or equivalent and junior standing in the English major.*

ENG 1710 Freshman English 1 (Honors) **4 QH**
Honors equivalent of ENG 1110.

ENG 1711 Freshman English 2 (Honors) **4 QH**
Honors equivalent of ENG 1111.

ENG 1721 Survey of English Literature 2 (Honors) **4 QH**
Honors equivalent of ENG 1121.

ENG 1723 Survey of American Literature 1 (Honors) **4 QH**
Honors equivalent of ENG 1123.

ENG 1725 Technical Writing (Honors) **4 QH**
Honors equivalent of ENG 1125.

ENG 1750 Intermediate Writing (Honors) **4 QH**
Honors equivalent of ENG 1350.

ENG 1758 Introduction to Shakespeare (Honors) **4 QH**
Honors equivalent of ENG 1658.

ENG 1781 Writing for Business (Honors) **4 QH**
Honors equivalent of ENG 1381.

ENG 1810, ENG 1811 Directed Study **4 QH each**

ENG 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Geology

GEO 1119 Marine Resources **4 QH**
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.

GEO 1120 Physical Oceanography **4 QH**
Provides a description of the physical properties and composition of seawater, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.

GEO 1121 Biological Oceanography **4 QH**
Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.

GEO 1122 New England Fishery Resources **4 QH**
Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.

GEO 1128 Geology of Oceans and Coasts **4 QH**
Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (Core Category II)

GEO 1140 Environmental Geology **4 QH**
Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal. (Core Category VI)

GEO 1141 Geological Hazards and Resources **4 QH**
Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (Core Category II)

GEO 1154 Planetary Astronomy **4 QH**
Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (Core Category V)

GEO 1158 Weather and Climate **4 QH**
Discusses the patterns and processes that combine to produce our daily weather and how weather integrates over time to define climate. Identifies natural and man-made causes of climate change.

GEO 1208 Age of Dinosaurs **4 QH**
Focuses on major physical and biological events of the Mesozoic Era of Earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.

GEO 1212 Physical Geology **4 QH**
Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (Core Category II)

GEO 1213 Physical Geology Laboratory **1 QH**
Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. *Prereq. GEO 1212; may be taken concurrently.*

GEO 1222 Historical Geology **4 QH**
Traces the physical and biological history of the Earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (Core Category II)

GEO 1223 Historical Geology Laboratory **1 QH**
Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks. *Prereq. GEO 1222; may be taken concurrently.*

GEO 1250 Advanced General Geology **4 QH**
Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq. GEO 1212 and GEO 1222.*

GEO 1308 Petrology **5 QH**
Studies the hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types. Lab fee. *Prereq. GEO 1212.*

GEO 1310 Descriptive Mineralogy **5 QH**
Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. Lab fee. *Prereq. Two quarters of chemistry.*

GEO 1311 Optical Crystallography **5 QH**
Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. Lab fee. *Prereq. GEO 1310.*

GEO 1312 Petrography **5 QH**
Covers description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships. *Prereq. GEO 1311.*

GEO 1320 Field Geology **4 QH**
Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. Fulfills the College's experiential education requirement for geology majors. *Prereq. GEO 1212.*

GEO 1412 Geochemistry **4 QH**
Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq. Two quarters of chemistry.*

GEO 1414 Igneous and Metamorphic Petrology **5 QH**
Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq. GEO 1312.*

GEO 1418 Structural Geology **5 QH**
Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq. GEO 1212 and GEO 1213.*

GEO 1420 Geophysics **4 QH**
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the Earth's crust. *Prereq. GEO 1212 or instructor's permission.*

GEO 1424 Stratigraphy **5 QH**
Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq. GEO 1222.*

GEO 1428 Invertebrate Paleontology **5 QH**
Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates. Lab fee.

GEO 1430 Sedimentation and Sedimentary Environments **5 QH**
Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.

GEO 1432 Sedimentary Petrology **5 QH**
Covers origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq. GEO 1311.*

GEO 1435 Coastal Processes **5 QH**
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq. GEO 1212.*

GEO 1436 Marine Geology **4 QH**
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq. GEO 1212.*

GEO 1438 Geology and Land-Use Planning **4 QH**
Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq. GEO 1140, GEO 1212, or permission of instructor.*

GEO 1440 Geomorphology **5 QH**
Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq. GEO 1212.*

GEO 1441 Geographical Information Systems **4 QH**
Offers an introduction to GIS, the computer hardware, software, and personnel, used to input, store, analyze, and display spatial data. Studies its application to geological mapping and data analysis. Introduces students to GIS concepts and to practical issues of manipulating GIS software through exercises.

GEO 1442 Environmental Planning **4 QH**
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization, and applies this information to an understanding of regulatory processes. (Core Category VI) *Prereq. GEO 1212 or permission of instructor.*

GEO 1444 Glacial and Pleistocene Geology **5 QH**
Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq. GEO 1222.*

GEO 1446 Hydrogeology **4 QH**
Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq. GEO 1212, MTH 1107 or 1123, or permission of instructor.*

GEO 1447 Groundwater Modeling **4 QH**
Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. Lab fee. *Prereq. Introductory calculus.*

GEO 1448 Groundwater Geochemistry **4 QH**
Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq. Two quarters of chemistry.*

GEO 1450 Geology Seminar **4 QH**
Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq. Major in geology or senior status.*

GEO 1712 Physical Geology (Honors) **4 QH**
Honors equivalent of GEO 1212. (Core Category II)

GEO 1722 Historical Geology (Honors) **4 QH**
Honors equivalent of GEO 1222. (Core Category II)

GEO 1754 Planetary Astronomy (Honors) **4 QH**
Honors equivalent of GEO 1154. (Core Category V)

GEO 1816, GEO 1817 Undergraduate Research **4 QH each**
Offers independent research on a selected topic under the direct supervision of a faculty member. Fulfills the College's experiential education requirement for geology majors. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study **4 QH each**
Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. Fulfills the College's experiential education requirement for geology majors. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies **1 QH each**
Offers independent study of a specific topic. Fulfills the College's experiential education requirement for geology majors. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

GEO 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

History

HST 1101 Western Civilization to 1648 **4 QH**
Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. *Not open to students who have completed HST 1121, HST 1701, or HST 4110.* (Core Category II)

HST 1102 Western Civilization Since 1648 4 QH
Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. *Not open to students who have completed HST 1122, HST 1702, or HST 4111.* (Core Category II)

HST 1121 World Civilization to 1648 4 QH
Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701, or HST 4110.* (Core Category IV)

HST 1122/IAF 1122 World Civilization Since 1648 4 QH
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102, HST 1702, or HST 4111.* (Core Category IV)

HST 1201 The United States to 1877 4 QH
Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (Core Category II)

HST 1202 The United States Since 1877 4 QH
Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (Core Category II)

HST 1241 The Historian's Craft 4 QH
Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which s/he works. (Core Category II)

HST 1243 American Historians (Group C) 4 QH
Focuses on the literature of American history; major American writers of American history from the colonial period to the present, with emphasis on changing form and substance.

HST 1270 Introduction to Public History 4 QH
Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1301 Topics in European History (Group A or B) 4 QH
Covers topics in European history from antiquity to the present.

HST 1311 Ancient Greece (Group A) 4 QH
Studies the origins and development of Greek civilization; political evolution of Hellenic society from tribal to city-state organization; and the growth and application of Greek religious, political, and ethical ideas.

HST 1315 Ancient Rome (Group A) 4 QH
Examines Roman civilization in two sequences: the rise of Roman power under the Republic and the decline of Roman power under the Empire.

HST 1321 Medieval Europe (Group A) 4 QH
Studies Europe from the fall of Rome to the fifteenth century; the expansion of Christianity; the growth of the power of the papacy; the development of monarchies; popular culture, heresy, and witchcraft; crusades; cathedrals, warriors, and saints. Emphasizes cultural and intellectual change. (Core Category III)

HST 1331 Renaissance Civilization (Group A) 4 QH
Focuses on Europe from 1300 to 1600. Topics include political, economic, and social changes; advances in technology, science, and warfare; overseas expansion; changes in artistic vision; and struggles over religious and scientific beliefs. Emphasizes cultural and intellectual change. (Core Category III)

HST 1336 Luther and His Age (Group A) 4 QH
Studies Martin Luther, John Calvin, Henry VIII, Elizabeth I, and their political and religious contemporaries who, between 1500 and 1650, overthrew the church's monopoly of religion, forged new relationships between princes and subjects, found new ways to create wealth, challenged the traditional roles of men and women in families and communities, and created new attitudes toward national and international politics.

HST 1355 Tudor England (Group A) 4 QH
Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World. Provides hands-on experience with Tudor sources.

HST 1393 History of Science and Technology (Group A, B, C, or D) **4 QH**
Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C) **4 QH**
Traces the history of nonpowered flight, beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci; from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1401 Topics in Soviet and Russian History (Group B) **4 QH**
Covers special topics in Soviet and/or Russian history.

HST 1402 Topics in European History (Group A or B) **4 QH**
Covers special topics in European history.

HST 1407 Europe, 1870–1921 (Group B) **4 QH**
Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe Since 1921 (Group B) **4 QH**
Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

HST 1424 Victorian England (Group B) **4 QH**
Discusses the economic, social, and political life of the English people during Victoria's reign. (Core Category IV)

HST 1425 The Decline of Great Britain (Group B) **4 QH**
Discusses the economic, social, and political life of the English people in the twentieth century. (Core Category IV)

HST 1433 The French Revolution and Napoleon (Group B) **4 QH**
Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.

HST 1441 Hitler's Germany (Group B) **4 QH**
Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.

HST 1451 Imperial Russia (Group B) **4 QH**
Focuses on the emergence of Russia as a recognized European power, westernization and expansion in the eighteenth century, the impact of Napoleon, and reform and revolution.

HST 1452 Soviet Russia (Group B) **4 QH**
Examines forces molding the history of Russia since 1917, internal developments, and foreign relations.

HST 1472 The Family in European History (Group B) **4 QH**
Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.

HST 1473 Women in Modern Europe (Group B) **4 QH**
Examines the history of women in Western Europe from the French Revolution of 1789 to the present, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.

HST 1481 The Culture of Europe (Group B) **4 QH**
Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (Core Category III)

HST 1485 Communism and Revolution (Group B) **4 QH**
Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490/INT 1150/SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C) **4 QH**
Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. (Core Category II)

HST 1491 Modern Western Economic History (Group B or C) **4 QH**
Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (Core Category III)

HST 1493 Work and Leisure (Group B or C) **4 QH**
Examines the historical evolution of contemporary patterns of work and leisure with attention to gender, race, and class lines. Topics include the impact of machine technology on the worker and the workplace, workers organizing in unions and professional groups, changing concepts of the use of time, women's work and women's leisure; recreation and sports (both participant and spectator); and the rise of the cafe and the saloon as sociable institutions. (Core Category III)

HST 1494 History and Film (Group A, B, or C) **4 QH**
Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (Core Category II)

HST 1495 Technological Transformations of Society (Group B, C, or D) **4 QH**
Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments. (Core Category V)

HST 1496 War in the Twentieth Century (Group B, C, or D) **4 QH**
Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World Since 1945 (Group B, C, or D) **4 QH**
Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War. Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and countercultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C) **4 QH**
Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C) **4 QH**
Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (Core Category III)

HST 1511 The American Revolution (Group C) **4 QH**
Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C) **4 QH**
Focuses on the events surrounding the southern effort to expand slavery into the territories that led to the Civil War. Emphasizes the significant impact of Abraham Lincoln upon the war's outcome. Also examines Reconstruction, the effort to reunite the North and South at war's end, and explores the major role that African-Americans played throughout the period.

HST 1516 The United States, 1898–1939 (Group C) **4 QH**
Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939–1960 (Group C) **4 QH**
Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States Since 1960 (Group C) **4 QH**
Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525/AFR 1131 African-American History 1 to 1900 (Group C) **4 QH**
Covers the development of black America from slavery through the Booker T. Washington–W.E.B. DuBois controversy, with emphasis on the historical links between Africa and America that have shaped the African-American experience. Includes in-depth discussion of slavery's impact, the role of the antebellum free black, the Civil War and Reconstruction, and the black response to the new racism of the late nineteenth century. (Core Category III)

HST 1526/AFR 1132 African-American History 2 Since 1900 (Group C) **4 QH**
Examines the modern development of black America, with major emphasis on the twentieth century and the rising tide of African-American nationalism. Provides an historical perspective regarding key contemporary issues, including the founding of the NAACP, the Marcus Garvey back-to-Africa movement, the Harlem Renaissance, the Black Muslims, the impact of Martin Luther King, and the idea of Black Power.

HST 1533 History of Boston (Group C) **4 QH**
Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

HST 1537 Latin America and the Caribbean in Boston (Group C) **4 QH**
Explores the experiences of Latin American and Caribbean origin groups—particularly Brazilians, Central Americans, Dominicans, Haitians, Puerto Ricans, and West Indians—in twentieth-century Boston. Studies the historical, economic, political, and cultural forces affecting immigration from each country. (Core Category VI)

HST 1538 History of Latinos(-as) in the United States (Group C) **4 QH**
Examines the history and experiences of the major Latino subgroups—Chicanos, Cubans, and Puerto Ricans—and the new immigrants from Central America and the Caribbean. Studies historical events in the context of the larger "American"—North and South—experiences. Topics include United States' expansion and imperialism in the Southwest and the Caribbean; migration patterns; forms of ethnic nationalism; political participation and mobilization; migratory labor and immigration policies; gender and class distinctions; cultural expressions; the effects of post-industrialization and economic restructuring; and interethnic relations. (Core Category VI)

HST 1539 American Jewish History (Group C) **4 QH**
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.

HST 1543 American Urban History (Group C) **4 QH**
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (Core Category VI)

HST 1544 Environmental History of the United States (Group C) **4 QH**
Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (Core Category VI)

HST 1548 American Cultural History to 1860 **4 QH**
Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.

HST 1549 American Popular Cultural History Since 1860 **4 QH**
Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of advertising and consumerism, technological change and its meaning, the rise of sports, suburban life from the 1950s onward, 1960s "counter culture," and neo-conservatism. Emphasizes the interaction of a wide range of cultural forms, including popular literature and music, film, television, and the mail-order catalog.

HST 1553 The Family in American History (Group C) **4 QH**
Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.

HST 1555 American Elites (Group C) **4 QH**
Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.

HST 1556 History of the American Home (Group C) **4 QH**
Studies the American home from 1600 to the present. Extensively uses visual materials to develop an above-ground "archeology" of the American home to teach students how things—furnishings, buildings, landscape—contain hidden meanings that can reveal the intimate details of the everyday lives of ordinary and extraordinary Americans. Includes analysis of the ways in which the broader political, economic, and social issues of the past were reflected in Americans' physical surroundings. (Core Category II)

HST 1558 Women in America 1600–1914 (Group C) **4 QH**
Examines themes in the history of women from colonial times to World War I, with special attention to differences of race, class, ethnicity, and sexuality. Studies the activities of Native American women, the experience of slavery for black women, women's activities in wars (the Civil War and World War I), and women's work in the making of industrial capitalism. (Core Category III)

HST 1559 Women in America, 1914–Present (Group C) **4 QH**
Examines themes in the history of women in America from World War I to the present. Studies the experiences of women in the World Wars, in the labor force and in the labor movement, women's activities in social movements, their experience of the Depression of the 1930s, women's private lives in the family, and sexuality. (Core Category III)

HST 1563 History of Sport in America (Group C) **4 QH**
Provides a history of the major sports and their impact on American life.

HST 1571 American Business History (Group C) **4 QH**
Examines the rise of business in America. Studies the role of the corporation, horizontal and vertical combinations, business and labor, and business and government.

HST 1575 History of Media in America (Group C) **4 QH**
Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.

HST 1577 America and the Sea (Group C) **4 QH**
Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.

HST 1578 The Automobile in America (Group C) **4 QH**
Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.

HST 1581 The Gilded Age and the Progressive Era, 1877–1920 **4 QH**
Examines the transformation of American society and its economy and analyzes how government responded to these sweeping changes from the 1870s through World War I.

HST 1582 The Growth of American Government Since 1935 (Group C) **4 QH**
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.

HST 1585 American Diplomatic History (Group C) **4 QH**
Focuses on the formation and administration of American foreign policy from the American Revolution to the present.

HST 1586 American Military History (Group C) **4 QH**
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.

HST 1591 American Images of China (Group C or D) **4 QH**
Examines the relationship between Sino-American international relations and changes in American popular perceptions of China as revealed in the media and literature. Focuses on Sino-American relations since the nineteenth century, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.

HST 1592 History of the Vietnam War (Group C or D) **4 QH**
Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.

HST 1600 Topics in Global History (Group A, B, C, or D) **4 QH**
Covers special topics in global history.

HST 1601 Canadian History (Group D) **4 QH**
Explores the history of Canada from the time of the arrival of the First Nations to the present, with emphasis on Canadian relations with the United States and on the background of the Quebec separatist movement.

HST 1604 Modern Latin America (Group D) **4 QH**
Traces the developments in this region since independence and the inception of nationhood. Topics include: state formation and society in the nineteenth century; economic development and underdevelopment in the region; race, class, and ideology; United States/Latin American relations; populism; the roots of revolution and authoritarianism; and the contemporary experiments with neoliberal policies.

HST 1605 The Modern Caribbean (Group D) **4 QH**
Focuses on the social, economic, and cultural forces that have shaped the character of the Caribbean people. Examines the variety of societies, cultures, and institutions of the region in their historical and contemporary settings, beginning with pre-Colombian cultures, moving through the colonial period, plantation agriculture, slavery, the expansion of U.S. influence, urbanization, economic development models, authoritarian politics, and the contemporary migration of Caribbean people to the United States and Europe.

HST 1607 The Columbian Exchange (Group A or C) 4 QH
Studies the cultural impact of Europe on the New World and the New World on Europe from the fifteenth through the seventeenth centuries, through an understanding of the societies from whence the Europeans originated; the impact their motives and concepts of power, race, and gender had in the radical reshaping of the cultures they encountered; and the influence of the discovery and early colonization on Europe. Requires students to read widely in the current historical literature and examine the images, artifacts, and literature of the period.

HST 1610 Topics in Asian History (Group D) 4 QH
Covers special topics in the history of Asia.

HST 1612 The Modern Middle East (Group D) 4 QH
Focuses on the Middle East since 1800, with emphasis on the background of present problems. (Core Category VI)

HST 1613 The Contemporary Middle East (Group D) 4 QH
Focuses on political, economic, and social developments in the Middle East since World War II.

HST 1620/AFR 1191 Early African Civilization (Group D) 4 QH
Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800.

HST 1621/AFR 1197 Modern African Civilization (Group D) 4 QH
Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. (Core Category IV)

HST 1623/AFR 1403 West African History (Group D) 4 QH
Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria.

HST 1625/AFR 1405 South African History (Group D) 4 QH
Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting.

HST 1628/AFR 1628 The African Diaspora (Group D) 4 QH
Explores the creation and transformation of the African Diaspora—connections among communities of African descent in Africa, the Americas, Europe, and Asia. Centers on the years from 1500 to the present and emphasizes connections among the themes of migration, identity, and popular culture.

HST 1633 Modern China (Group D) 4 QH
Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.

HST 1634 Contemporary China (Group D) 4 QH
Examines Chinese policy, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.

HST 1637 The Making of Modern Japan: From Samurai to Sony (Group D) 4 QH
Surveys the evolution of Japan from a Third World nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post–World War II modern economic miracle.

HST 1644 Third World Women 4 QH
Explores the complex gender dynamics of women in non-Western societies during the years of Western imperialist domination, nationalist resistance struggles, and postcolonialism. Begins by deconstructing the term "Third World" and seeing how that term can be read against the context of imperialism. Examines gender constructs in the Third World through a variety of written and visual materials, including autobiographical accounts, ethnographies, historical fiction, films, and slides. Topics include patterns of gender domination and female resistance, the interplay of race and gender hierarchies under colonial rule, the Western gaze and representations of Third World "primitive" women, the feminization of labor and the global economy, reproductive strategies, and sex trafficking. (Core Category IV)

HST 1652 Islam Resurgent (Group D) 4 QH
Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (Core Category VI)

HST 1670 Introduction to Third World History (Group D) 4 QH
Poses the question "How did more than half of the population of the Earth come to be referred to as the "Third World"? Examines the different socioeconomic explanations of global inequality. Studies images and ideologies that defined the emerging Third World, as well as various perspectives from the Third World, including cargo cults, religious revival, westernizers, liberation movements, Mahatma Ghandi, and Mao Zedong. Finally asks if the Third World is now disappearing amid changing relations between global powers.

HST 1701 Western Civilization 1 (Honors) 4 QH
Honors equivalent of HST 1101.

HST 1702 Western Civilization 2 (Honors) 4 QH
Honors equivalent of HST 1102.

HST 1711 America to 1877 (Honors) 4 QH
Honors equivalent of HST 1201.

HST 1712 America Since 1877 (Honors) 4 QH
Honors equivalent of HST 1202.

HST 1790 Population in European History (Group A or B) (Honors) 4 QH
Examines through population studies the causes and consequences of changes in human birth, death, marriage, and migration rates from the Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (Core Category III)

HST 1801, HST 1802 Directed Study **4 QH each**

HST 1805 Senior Research Seminar **4 QH**
The capstone course of the undergraduate history major. Gives students an opportunity to pursue a major research project of their own choosing under the close supervision of faculty. Emphasizes the techniques of research and interpretation of research findings. Gives special attention to methodology and to the incorporation of methodological perspectives in research and writing.

HST 1811, HST 1812 **4 QH each**
Junior/Senior Honors Program
For details, contact the honors office.

HST 1814 Honors Directed Study **4 QH**
Designed for students preparing Junior–Senior Honors proposals. *Prereq. Eligibility to undertake a Junior–Senior Honors Program thesis or project.*

HST 1821, HST 1822 Fieldwork in History 1 and 2 **4 QH each**
Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. *Prereq. HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses. College of Arts and Sciences experiential education requirement.*

HST 1850 Approaches to American History (Group C) **1 QH**
Covers a special topic in U.S. history.

HST 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

HST 1899 Advanced Television Production **4 QH**
Provides students with guidance in the development of special projects in television and video production. Includes advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and postproduction technology. *Prereq. Permission of instructor.*

Human Services

HS 1101 The Human Services Professions **4 QH**
Explores what a human service agency is, how it comes into being, and how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq. ED 1100, SOC 1100, or equivalent.*

HS 1210 Intervention Strategies for the Human Services **4 QH**
Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

HS 1240/SOC 1240 Sociology of Human Service Organizations **4 QH**
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

HS 1260/SOC 1324 Human Services Research and Evaluation **4 QH**
Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics of formulating questions and measuring answers, designing evaluations and planning-oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. Requires team service-learning projects. *Prereq. SOC 1320 or other statistics, SOC 1240, or permission of instructor.*

HS 1333 Senior Seminar in Human Services **4 QH**
Designed for seniors in human services. Examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

HS 1336, HS 1337 Field Internship in Human Services 1 and 2 **6 QH each**
Human services students are required to fulfill two internship placements during the last two years of their program. Each placement consists of 150 hours on-site and varies according to the students' interests. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. *College of Arts and Sciences experiential education requirement. Prereq. Junior or senior standing and approval by the Human Services Internship coordinator by early in quarter previous to planned quarter of internship.*

Interdisciplinary Courses

INT 1121/LNS 1121/SOA 1121 **4 QH**
Introduction to Latino, Latin American, and Caribbean Studies
Offers an interdisciplinary introduction to Latinos and people of Latin American and Caribbean origin in the United States as well as to the regions of Latin America and the Caribbean. Dispels a series of powerful myths associated with U.S. Latinos and in Latin American and Caribbean society, such as racial inferiority, poverty, machismo, and violence. Introduces the construction of Latino, Latin American, and Caribbean identities as well as the politics, economics, history, and culture.

INT 1150 **4 QH**
Introduction to Women's Studies: Image, Myth, and Reality
Surveys the issues and methodologies involved in the interdisciplinary study of women. Examines the political, economic, social, and historical processes that have created both the image and the reality of women in societies. Guest lecturers provide an overview of the diverse disciplinary approaches to the study of women. (Core Category II)

INT 1201 An Analysis of American Racism 4 QH
Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World 4 QH
Focuses on the seas' complexity and the far-reaching consequences of our interactions with them. A comprehensive interdisciplinary introduction to the oceans. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq. Permission of instructor.*

INT 1216 Maritime History of New England 4 QH
Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq. Permission of instructor.*

INT 1217 Water Resources Planning and Management 4 QH
Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems in all their dimensions—political, economic, and technological. *Prereq. Permission of instructor.* (Core Category VI)

INT 1219 Advanced Seminar in Marine Studies 4 QH
Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines, including scientific, legal, economic, and technical aspects of issues that come into play in marine affairs. Seminars are led by experts actively involved in the issues.

INT 1220 Coastal Zone Management 4 QH
Focuses on outstanding issues in coastal environmental affairs. Discusses scientific, legal, economic, and technical aspects of coastal issues, and integrates them into problem-solving exercises. *Prereq. Permission of instructor.*

INT 1302 Feminist Perspectives on Society 4 QH
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that analyzes issues affecting women's health and safety, including violence against women and abortion. Considers and evaluates women's views of social life and recognizes differences among women, including perspectives of women of color. (Core Category VI)

INT 1320 Exploring the Humanities Through Film 4 QH
Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents films for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (Core Category II)

INT 1570 On Understanding Science 4 QH
Develops the quantitative and qualitative skills needed to read critically about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications 4 QH
Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq. BIO 1261.*

INT 1702 War Work: The Experience of World War II (Honors) 4 QH
Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1709 Cultural Passages in the Arts—Boston 4 QH
Exposes students to the richness of the Boston cultural environment through a directed field study with various Northeastern University faculty. Students will be required to keep a detailed journal and produce a final creative project. Field trips will include various museums, theaters, and some neighborhoods within the city of Boston.

INT 1715 Iceland (Honors) 4 QH
Honors interdisciplinary seminar on the history, Nordic literature, and geology of Iceland.

INT 1721 Modernism: Art, Film, and Literature (Honors) 4 QH
Honors equivalent of INT 1321.

INT 1899 Advanced Television Production 4 QH
Provides students with guidance in the development of special projects in television and video production. Studies advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and postproduction technology. Students involved in the Northeastern Student Network project may also receive credit.

International Affairs

IAF 1100 Introduction to International Affairs 4 QH
Introduces the study of international affairs through lectures, guest lectures, discussions, case studies, films, and readings across disciplines. Provides students with a basis for understanding the global village. Covers a range of issues including politics, economics, history, society and culture, and the environment.

IAF 1104/SOA 1104 Cultures of the World 4 QH
Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (Core Category II)

IAF 1112/POL 1112 Introduction to International Relations **4 QH**
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (Core Category II)

IAF 1113/POL 1113 Introduction to Foreign Governments **4 QH**
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

IAF 1122/HST 1122 World Civilization Since 1648 **4 QH**
Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of the American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. (Core Category IV)

IAF 1190/ECN 1190 The Global Economy **4 QH**
Introduces the history, structure, and growth of the international economy. Considers dimensions of global economic interdependence, including population, foreign investment, and environmental spillovers. Analyzes a few key economic issues of current importance for major regions of the world, such as economic integration in Western Europe or the emergence of the East Asian dragons.

IAF 1300 International Conflict and Negotiation **4 QH**
Introduces students to the dynamics of conflict in the international arena: how conflicts evolve, fester, and are managed and resolved. Covers different types of regional and international conflicts, focusing on historical, economic, social, and political aspects of a variety of conflicts and the consequences they hold for regional and international actors. (Core Category V)

IAF 1400 International Experience Workshop **4 QH**
Provides an opportunity for students who have completed their International Experience requirement for the major or minor in international affairs to participate in a workshop coordinated by a faculty member of the program. Students will prepare materials for the class relating to the political, social, economic, historical, and cultural aspects of the countries where they have studied, worked, or interned. (This course is open to other students who have comparable international experience.) *Fulfills the college's experiential education requirement for international affairs majors.*

IAF 1870 Senior Seminar in International Affairs **4 QH**
Develops one or two main topics to be decided by the instructor in consultation with faculty and students in the International Affairs program. Topics, which vary from year to year, may include, for example, emerging economies, world trade, arms control, and global stability.

IAF 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Journalism

JRN 1103 Newswriting 1 **4 QH**
Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required.

JRN 1104 Newswriting 2 **4 QH**
Offers practice in multiple-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq. JRN 1103 with grade of C or better.*

JRN 1105 Computer-Assisted Reporting **4 QH**
Introduces novices to the computing skills needed by today's journalists, yet holds sufficient challenges for those who have already found their way onto the World Wide Web. Presents material in two sections. Part one, Using the Internet, contains parallel study of using the Internet to enhance news stories published in familiar formats such as newspaper, magazine, radio, and television, and using the Internet to publish material. Part two, Database Computer Skills for Journalists, focuses on the many sources of information available via computer that can be reconfigured to help reporters research and write a news story. *Prereq. JRN 1103 with grade of C or better.*

JRN 1206 Editing **4 QH**
Provides practice in copy editing, headline writing, and origination editing. Presents assignments in photo selection, cropping, and cutline writing. Introduces page layout. *Prereq. JRN 1104 with grade of C or better and middler status.*

JRN 1250 Interpreting the Day's News **4 QH**
Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (Core Category VI) *For nonmajors as well as majors.*

JRN 1301 Basic Photojournalism **4 QH**
Covers camera procedures, cropping techniques, theory, and photo captions.

JRN 1305 Techniques of Journalism **4 QH**
Provides practice in writing in-depth and multiple-source stories requiring significant research. Provides an introduction to investigative reporting, practice in feature writing, and a review of legal issues. *Prereq. JRN 1104.*

JRN 1320 Radio News Gathering and Reporting **4 QH**
Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq. JRN 1103.*

JRN 1336 Public Relations Principles **4 QH**
Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq. Upperclass standing.*

JRN 1350 Advertising Principles **4 QH**
Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq. Upperclass standing.*

JRN 1421 Television Newswriting **4 QH**
Covers writing for TV news, the importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes production of news shows, field trips to TV stations, and guest lecturers from TV news. *Prereq. JRN 1103, with a grade of C or better, or permission of instructor.*

JRN 1422 Television News Production **4 QH**
Demonstrates techniques used by electronic journalists and TV news producers. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq. JRN 1421.*

JRN 1423 Documentary Production **4 QH**
Provides students with an opportunity to research and produce short video documentaries and acquaints students with a range of professional documentary work through screenings and discussions. Working individually or in collaboration with up to two other class members, students will have the opportunity to propose, research, shoot, write, and edit video documentary projects that will be screened at the end of the quarter. *Prereq. JRN 1422 or permission of instructor.*

JRN 1432 Local Reporting **4 QH**
Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and State House reporters. *Prereq. JRN 1104 with a grade of C or better.*

JRN 1440 Design and Graphics **4 QH**
Introduces graphic design terminology and principles using Adobe PageMaker, a leading desktop publishing program. Provides students with the opportunity to learn how to plan a publication based on audience and budget. Includes design assignments such as newspapers, magazines, brochures, advertisements, and corporate identity programs. Emphasizes deadlines and quality of the printed publication.

JRN 1451 Advertising Copy Writing **4 QH**
Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail. Emphasizes fact gathering, copy structure, and advertising design. *Prereq. JRN 1103, and JRN 1350, or permission of instructor.*

JRN 1460 Public Relations Problems **4 QH**
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq. JRN 1336.*

JRN 1501 History of Journalism **4 QH**
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq. Upperclass standing.*

JRN 1508 Law of the Press **4 QH**
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq. Upperclass standing.*

JRN 1512 Journalism Ethics and Issues **4 QH**
Discusses the responsibilities of news media, ethical problems confronting decision-makers in various journalistic fields, and the principles found in codes of various professional societies. Students fulfill their experiential education requirement by writing a ten- to twelve-page paper on an ethical problem they faced while working in the media. *Prereq. Junior or senior status.*

JRN 1522 Magazine Writing **4 QH**
Covers writing and freelancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq. JRN 1104, with a grade of C or better.*

JRN 1552 Advertising Practice **4 QH**
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq. JRN 1451.*

JRN 1561 Public Relations Practice **4 QH**
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq. JRN 1103 and JRN 1336.*

JRN 1703 Newswriting 1 (Honors) **4 QH**
Honors equivalent of JRN 1103.

JRN 1704 Newswriting 2 (Honors) **4 QH**
Honors equivalent of JRN 1104.

JRN 1870, JRN 1880 Seminar **4 QH each**
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq. Upperclass standing.*

JRN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

JRN 1890 Directed Study in Journalism **4 QH**
Prereq. Permission of instructor.

JRN 1892 Topics: Beat Reporting **4 QH**
Prereq. Permission of instructor.

JRN 1894, JRN 1895, JRN 1896, JRN 1897 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

JRN 1899 Advanced TV Production **4 QH**
Provides students with guidance in the development of special projects in television and video production. Studies advanced directing (studio and field), lighting, scriptwriting, editing, graphics, and postproduction technology. Students involved in the Northeastern Student Network project may also receive credit. *Prereq. Permission of instructor.*

Linguistics

LIN 1118/ENG 1118 Introduction to Language and Linguistics 1 **4 QH**
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (Core Category II)

LIN 1119/ENG 1119 History of the English Language **4 QH**
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills/journals, and private and public letters. *Prereq. ENG 1110, ENG 1111, or equivalent.* (Core Category III)

LIN 1215/PHL 1215 Symbolic Logic **4 QH**
Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (Core Category II)

LIN 1218/ENG 1218 Introduction to Language and Linguistics 2 **4 QH**
A workshop that focuses on three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that underlie the linguistics system inside each language user's mind, with a slant toward "doing" linguistics: working with data, analyzing it, and ultimately explaining it. *Prereq. LIN 1118/ENG 1118 or permission of instructor.*

LIN 1220/LNL 1220 Introduction to Phonetics and Phonology **4 QH**
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LIN 1231/AFR 1231 African-American English **4 QH**
Addresses topics in the study of African-American English or Ebonics. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in schools.

LIN 1235/LNL 1235 Applied Linguistics **4 QH**
Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LIN 1240/LNL 1240 Bilingualism **4 QH**
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LIN 1245/LNF 1250 History of the French Language **4 QH**
Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq. Reading knowledge of French or permission of instructor.*

LIN 1250/ASL 1250 Linguistics of American Sign Language **4 QH**
Introduces the basic issues of linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq. ENG 1118 and the ability to follow lectures in ASL.*

LIN 1255/LNS 1250 History of the Spanish Language **4 QH**
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of Old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LIN 1260/LNL 1260 Introduction to Romance Linguistics **4 QH**
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object-pronoun placement, word order, creolization, and subject-pronoun use. Conducted in English. *Prereq. Reading knowledge of one Romance language or permission of instructor.*

LIN 1262/PSY 1262 Psychology of Language **4 QH**
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

LIN 1263/PSY 1263 Nonverbal Communication **4 QH**
Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq. PSY 1112 or PSY 1113.*

LIN 1335/SOA 1335 Language and Culture **4 QH**
Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and creoles. Includes several field assignments.

LIN 1362/PSY 1362 Child Language **4 QH**
Examines how language develops in children. *Prereq. LIN 1118, PSY 1262 or permission of instructor.*

LIN 1364/PSY 1364 Cognition **4 QH**
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113.*

LIN 1365/PSY 1365 Language and the Brain **4 QH**
Focuses on linguistic behavior from a neuropsychological viewpoint. Examines models of how the nervous system, the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq. PSY 1262 or permission of instructor.*

LIN 1401/ENG 1401 Introduction to Syntax **4 QH**
Offers an introduction to the mental rules that speakers of any language unconsciously follow when they combine words into meaningful sentences and when they decode the strings of sounds that they hear every day. Examines sentence structure, syntactic principles, universal grammar, and innateness in a Chomskyan generative framework. (Core Category V)

LIN 1407/ENG 1407 Introduction to Semantics **4 QH**
Focuses on meaning and how it is expressed in language through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what way is linguistic meaning determined by our perceptual system or our culture?

LIN 1408/ENG 1408 Topics in Linguistics **4 QH**
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.

LIN 1415/AFR 1415 African Languages **4 QH**
Provides an introduction to African languages and linguistics, beginning with a general overview of the diverse language families of Africa and their geographical distribution. Introduces the structures of African languages: the sound systems found in African languages (phonetics and phonology), processes of word formation (morphology), and the structures found at the sentential level (syntax). Looks at the current cultural and sociolinguistic issues facing African nations, including such topics as the different functions of African and European languages in African national language policies, education policies, and literacy issues.

LIN 1440/PHL 1440 Philosophy of Language **4 QH**
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quoin, Russell, Chomsky, and Fodor. *Prereq. Permission of instructor.*

LIN 1499/PSY 1499 Psychology of Reading **4 QH**
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq. PSY 1262 or PSY 1364.*

LIN 1562/PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1261 or PSY 1364.*

LIN 1564/PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1354 or PSY 1262.*

LIN 1661/PSY 1661 Seminar in Psycholinguistics **4 QH**
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1662/PSY 1662 Seminar in Cognition **4 QH**
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

LIN 1692 Seminar in Linguistics **4 QH**
Specific topics vary by quarter.

LIN 1693 Seminar in Linguistics **4 QH**
Specific topics vary by quarter.

LIN 1801 Directed Study **1 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1802 Directed Study **2 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1803 Directed Study **3 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1804 Directed Study **4 QH**
Offers independent work on a chosen topic under the direction of a faculty member. *Prereq. Permission of instructor.*

LIN 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Mathematics

MTH 1000 Mathematics Preliminaries 1 **4 QH**
Supplies, together with MTH 1010, the high-school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; operations on polynomials; solving simple first-degree equations; and laws of exponents. *Prereq. Permission of course coordinator.*

MTH 1010 Mathematics Preliminaries 2 **4 QH**
Supplies, together with MTH 1000, the high-school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes solving first- and second-degree equations and systems of equations; graphic lines and parabolas; solving equations with algebraic fractions; solving word problem applications. *Prereq. Permission of course coordinator.*

MTH 1101 Applications of Algebra **4 QH**
Examines linear equations and their graphs, and systems of linear equations and linear inequalities in two variables, with application to linear programming. Introduces matrices with application to Markov chains; set theory, techniques of counting; permutations and combinations and elementary probability. (Core Category I)

MTH 1102 Interactive Mathematics **4 QH**
Offers hands-on exploration of real-life situations, developing concepts from algebra, statistics, and linear programming as needed. Emphasizes problem-solving strategies. Designed for students who enjoy working in collaborative groups. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Core Category I).

MTH 1106 Functions and Algebra **4 QH**
Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. If time permits, also discusses some elementary trigonometry and vectors in the plane. *Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.*

MTH 1107 Functions and Basic Calculus **4 QH**
Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (Core Category I) *Prereq. MTH 1106. Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.*

MTH 1108 Basic Calculus 2 **4 QH**
Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations. *Prereq. MTH 1107.*

MTH 1113 College Mathematics for Business and Economics **4 QH**
Focuses on polynomial, exponential, logarithmic and logistic functions; their evaluation and algebraic solution; and their use (via the TI-83 graphing/statistical calculator) in the modeling of raw data. Studies the applications of modeling to basic business functions (demand, revenue, cost, and profit); interpolation and extrapolation; numerical solution, using the calculator, of algebraically difficult equations; and amortization and annuities. Requires a short project involving researching, then modeling, the financial history of a publicly traded firm of the student's choosing. Emphasizes applications to practical business and economic situations, and translation of mathematical results into a verbal form suitable for a business setting. Students are required to have a TI-83.

MTH 1114 Calculus for Business and Economics **4 QH**
Studies derivatives of power; exponential, logarithmic, and logistic functions and their compositions; interpretation of derivatives (slope, rate of change) and their application (approximation, marginal analysis, and optimization). Continues MTH 1113 emphasis on applications to practical business and economic situation; exploration and modeling of raw business or economic data using the TI-83 graphing/statistical calculator; and translation of mathematical results into a verbal form suitable for a business setting. Requires a term-long group project, designing a simple product, gathering premarketing data via field polling, modeling the data, using calculus to make business decisions, and delivering a short presentation. Students are required to have a TI-83. *Prereq. MTH 1113, or equivalent. Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2 **6 QH each**
Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high-school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1 **4 QH**
Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2 **4 QH**
Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. *Prereq. MTH 1123.*

MTH 1125 Calculus for Engineering Majors 3 **4 QH**
Introduces Taylor polynomials and series; studies differential equations and mathematical models. *Prereq. MTH 1124.*

MTH 1133 Calculus for Life Sciences 1 **4 QH**
Begins with the fundamentals of differential calculus and proceeds to specific problems encountered in biological research. Studies the formulation of physiological problems in terms of differential equations; solutions of differential equations by method of undetermined coefficients; and application to compartmental problems.

MTH 1134 Calculus for Life Sciences 2 **4 QH**
Studies integral calculus; trigonometric functions; solutions of differential equations by separation of variables; and advanced compartmental problems. Introduces pharmacokinetics, numerical integration, and Euler's method. *Prereq. MTH 1133.*

MTH 1135 Calculus for Life Sciences 3 **4 QH**
Presents functions of several variables, Taylor polynomials, and infinite series. *Prereq. MTH 1134.*

MTH 1137 Discrete Mathematics **4 QH**
Covers logic, binary arithmetic, basic set theory, Boolean algebra, and logic gates and their close interconnections. Also studies functions, permutations, combinatorics, proof by induction, algorithms, recursion, and recurrence relations.

MTH 1140 Calculus for Science Majors 1 **4 QH**
The sequence MTH 1140–1142 is equivalent to MTH 1123–1125, but geared toward majors in mathematics, physics, chemistry, and computer science. MTH 1140 introduces differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average and instantaneous rates of change, derivatives, and the chain rule. Covers applications of the derivative to curve sketching, related rates, and optimization.

MTH 1141 Calculus for Science Majors 2 **4 QH**
Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. *Prereq. MTH 1140.*

MTH 1142 Calculus for Science Majors 3 **4 QH**
Introduces Taylor polynomials and series; studies differential equations and mathematical models. *Prereq. MTH 1141.*

MTH 1150 Probability, Statistics, and the Computer **4 QH**
Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. *Prereq. Nonmath majors.*

MTH 1152 Statistical Thinking **4 QH**
Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings from a wide variety of sources. Uses extensive class discussion and homework problems to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (Core Category II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1170 Mathematical Discovery and Computers **4 QH**
Introduces the computer as a tool for mathematical discovery as well as an object of study. Both the mathematical and computer components may vary, but the nature of mathematical exploration and the solving of challenging problems are consistently emphasized.

MTH 1187 Probability **4 QH**
Presents an introduction to probability and probabilistic reasoning, sample spaces, events, and axioms. Studies conditional probability and Bayes' Law, independence, random variables and their distributions, joint distributions, expected value, and variance. Topics also include the law of large numbers, central limit theorem, and the use of probability in statistical inference. *Prereq. MTH 1137 or equivalent.*

MTH 1188 Problem Solving and Pre-Calculus 1 **6 QH**
Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation, and the graphing of functions. A graphing calculator is required for this course; the TI-83 is strongly recommended. *Prereq. BSET majors only. Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2 **6 QH**
Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. A graphing calculator is required for this course; the TI-83 is strongly recommended. (Equivalent to MTH 1192.) *Prereq. BSET majors only.*

MTH 1191 College Algebra **4 QH**
Examines laws of exponents, factoring, operations with fractional expressions, radical and complex numbers, Pythagorean Theorem and distance formula, linear and quadratic equations and inequalities, and functional notation. Includes graphing of a wide variety of functions and equations, including liens, conic sections, and polynomials. Studies solutions to many types of equations, including linear, quadratic, and polynomial. Explores many applications of algebra. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. *Prereq. BSET majors only. Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus **4 QH**
Studies exponential and logarithmic functions, trigonometric functions of angles and degrees and radians, trigonometric identities and equations, right triangles, law of sines and cosines, inverse trigonometric functions, and polar coordinates. Examines complex numbers in trigonometric form, systems of linear and nonlinear equations, binomial theorem, arithmetic and geometric sequences and series. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Equivalent to MTH 1189.) *Prereq. MTH 1191 or MTH 4107; BSET majors only.*

MTH 1193 Calculus 1 **4 QH**
Studies general function operations, theory and evaluation of limits, derivatives of algebraic and trigonometric functions, general rules of differentiation, Rolle's Theorem, and Mean Value Theorem. Covers applications of differentiation including velocity and acceleration, related rates, maximum and minimum problems, curve sketching, and approximations by differentials. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Not equivalent to MTH 1123.) *Prereq. MTH 1192 or MTH 4108; BSET majors only.*

MTH 1194 Calculus 2 **4 QH**
Begins with antidifferentiation and the solution of problems solved by simple differential equations. Examines the Riemann sum and the development of the fundamental theorem with applications to areas, volumes, and rectilinear motion problems. Topics include logarithmic, exponential, and inverse trigonometric functions and their applications. Studies techniques of integration including parts, partial fractions, substitution, and the use of tables, L'Hôpital's rule, improper integrals, and geometry of vectors in a plane and space. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Not equivalent to MTH 1124.) *Prereq. MTH 1193 or MTH 4120; BSET majors only.*

MTH 1195 Calculus 3 **4 QH**
Begins with sketching surfaces in space, leading to a study of functions of several variables, partial derivatives, and multiple integrals with applications to area and volume. Studies sequences and series to the development of Taylor and Maclaurin series. Introduces differential equations including the solution, with applications, of first-order variables separable, first-order linear, and second-order linear homogeneous. A graphing calculator is required for this course; the TI-83 or TI-86 is strongly recommended. (Not equivalent to MTH 1125.) *Prereq. MTH 1194 or MTH 4121; BSET majors only.*

MTH 1196 Introductory Statistics/Differential Equations **4 QH**
Studies measures of central tendency, measures of variability, frequency distributions and the normal curve, percentiles and standard scores, correlation, inferential statistics, differences between means, analysis of variance (ANOVA), and nonparametric tests. Examines various types of differential equations and methods of solution, including first-order equations with variables separable and first-, second-, and higher-order homogeneous and nonhomogeneous linear equations with constant coefficients. Emphasizes applications and numerical methods throughout the entire course. A graphing calculator is required; either the TI-83 or TI-86 is strongly recommended. *Prereq. MTH 1994 or MTH 4121; BSET majors only.*

MTH 1203 History of Mathematics **4 QH**
Traces the development of the various branches of mathematics from ancient times to the present, with emphasis on the mathematics itself as well as on the mathematicians and cultures that produced it. Teaches students to compute in other number systems, to perform geometric constructions, and to learn proofs of some significant theorems. (Core Category III) *Prereq. Interest in history and mathematics.*

MTH 1212 Linear Programming **4 QH**
Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (Core Category II) *Prereq. One year of college mathematics.*

MTH 1223 Calculus for Engineering Majors 4 **4 QH**
Covers partial derivatives and multiple integrals, with applications. *Prereq. MTH 1125 or equivalent.*

MTH 1225 Differential Equations (Engineering) 1 **4 QH**
Studies ordinary differential equations with applications including mechanical vibrations and electrical circuits. Focuses on first-order equations and systems and second-order linear equations studied from various points of view: existence theory, analytic solution techniques (including Laplace transform), and numerical methods. Uses computer labs for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1226 Differential Equations (Engineering) 2 **4 QH**
Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq. MTH 1225 or equivalent.*

MTH 1230 Linear Algebra for Engineers **4 QH**
Introduces matrices through Guassian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq. MTH 1225.*

MTH 1238 Combinatorial Mathematics **4 QH**
Introduces techniques of mathematical proofs, including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion, Polyaenumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq. Two courses in calculus.*

MTH 1240 Chaos and Fractals 4 QH
Presents an experimental study, using simple mathematical models, of chaotic behavior in dynamical systems found in mathematics, science, and computer science. Goals include the development of experimental skills, integration of visual and analytical modes of thought, and an appreciation of issues of problem formulation and representation. *Prereq. MTH 1125, MTH 1137, and COM 1201 or equivalent.*

MTH 1243 Calculus for Science Majors 4 4 QH
Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq. MTH 1142.*

MTH 1244 Calculus for Science Majors 5 4 QH
Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq. MTH 1243.*

MTH 1245 Differential Equations (Science) 1 4 QH
Studies ordinary differential equations with applications. Focuses on first-order equations and systems and second-order linear equations studied from various points of view: existence theory, analytic solution techniques, and numerical methods. Introduces linear algebra, including eigenvalues and eigenvectors to study systems of equations. Uses computer labs for visualization and numerical approximation. *Prereq. MTH 1125 or equivalent.*

MTH 1246 Differential Equations (Science) 2 4 QH
Studies partial differential equations with applications. Discusses mathematical models, boundary and initial conditions, Fourier series, and solutions to the wave, diffusion, and Laplace's equation. Computer labs are used for visualization and numerical approximation. *Prereq. MTH 1245 or equivalent.*

MTH 1301 Linear Algebra 1 4 QH
Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions.

MTH 1302 Linear Algebra 2 4 QH
Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq. MTH 1301.*

MTH 1311 Real Analysis 1 4 QH
Provides the theory and technique for a rigorous treatment of calculus. Topics vary and may include the construction of the real numbers, continuity and convergence, differentiation and integration, and proofs of selected results such as the inverse and implicit function theorems. Emphasizes careful proofs throughout. *Prereq. MTH 1125 and 1238 or permission of instructor.*

MTH 1321 Introduction to Groups and Their Applications 4 QH
Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics. *Prereq. MTH 1301.*

MTH 1322 Topics in Rings, Fields, and Number Theory 4 QH
Introduces commutative rings, ideals, integral domains, fields, and Galois theory. Studies extension fields, Gaussian integers, and other topics as time permits. *Prereq. MTH 1321.*

MTH 1330 Number Theory 4 QH
Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq. MTH 1301 or permission of instructor.*

MTH 1337 Foundations of Mathematics 1 4 QH
Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (Core Category V)

MTH 1347 Applied Analysis 4 QH
Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq. MTH 1245, MTH 1246, and MTH 1301 or equivalents.*

MTH 1349 Numerical Analysis 1 4 QH
Presents various topics including roots of nonlinear equations, systems of linear equations, interpolation, curve-fitting, and approximation of functions. Emphasizes understanding issues such as how good a numerical solution is or how efficient a method is, rather than theorem-proving or numerical recipes.

MTH 1350 Numerical Analysis 2 4 QH
Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349.

MTH 1351 Functions of a Complex Variable 1 4 QH
Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq. MTH 1243 or equivalent.*

MTH 1352 Functions of a Complex Variable 2 **4 QH**
Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq. MTH 1351.*

MTH 1360 Seminar in Applied Mathematics **4 QH**
Offers students of mathematics the experience of utilizing their skills to study problems that arise in industry and other "real-world" settings. Provides students with the opportunity to build on exciting industrial experiences that they may have had through co-op or other employment. *Arts and Sciences experiential education requirement. Prereq. Junior or senior status and some experience or interest in applied mathematics.*

MTH 1367 Geometry **4 QH**
Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq. Basic linear algebra or permission of instructor.*

MTH 1384 Probability for Engineering **4 QH**
Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq. MTH 1223 and MTH 1225 or equivalent.*

MTH 1387 Probability 1 **4 QH**
Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; Law of Large Numbers; and central limit theorem. *Prereq. MTH 1223 or MTH 1244.*

MTH 1388 Probability 2 **4 QH**
Studies selected topics, including introduction to stochastic processes, with emphasis on Markov chains or random walk. *Prereq. MTH 1384, or MTH 1387.*

MTH 1390 Mathematical Statistics **4 QH**
Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. *Prereq. MTH 1137, MTH 1384 or MTH 1387.*

MTH 1710, MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726, MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741, MTH 1742, Honors Program **4 QH each**
Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, MTH 1142, MTH 1223, and MTH 1225, respectively.

MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805, MTH 1806, MTH 1807, MTH 1808 Directed Study **4 QH**
Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq. Permission of instructor. Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving **4 QH**
Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one-third to one-half of the course. Analyzes specific real-world models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq. Permission of instructor.*

MTH 1810 Directed Study **1 QH**
Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq. Permission of instructor.*

MTH 1811 Directed Study **2 QH**
Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq. Permission of instructor.*

MTH 1825, MTH 1826, MTH 1827, MTH 1828 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

MTH 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent coursework acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNC 1502, LNC 1553, LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNR 1550, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses, see pages 34–35. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNC 1553 Chinese Film: Gender, Ethnicity, and Urbanity
LNF 1521 French Film and Culture
LNF 1550 Introductory Film Analysis
LNF 1551 Film Theory
LNF 1557 Modernism: Art, Film, and Literature
LNF 1560 Film and Psychoanalysis
LNG 1554 Modern German Film and Literature
LNR 1550 History of Soviet Cinema
LNS 1550 Spanish Civil War in Spanish Film

Linguistics

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses, see page 00. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1250 History of the French Language
LNL 1235 Applied Linguistics
LNL 1260 Introduction to Romance Linguistics
LNS 1250 History of the Spanish Language

Literature and Culture (taught in English)

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNC 1502 Backgrounds of Chinese Culture
LNC 1553 Chinese Film: Gender, Ethnicity, and Urbanity
LNF 1510 Modern Philosophical French Literature in Translation
LNF 1512 Introduction to Literature
LNI 1510 The Works of Dante in Translation 1
LNI 1511 The Works of Dante in Translation 2
LNI 1512 Italian Seminar: Pirandello
LNR 1500 Backgrounds in Russian Culture
LNR 1510 The Works of Alexander Pushkin in Translation
LNR 1511 Russian Literature in Translation
LNR 1550 History of Soviet Cinema
LNS 1500 Backgrounds in Hispanic Culture
LNS 1501 Backgrounds of Latin American Culture
LNS 1506 Cervantes and His Times
LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance
LNS 1511 Introduction to Caribbean Literature
LNS 1512 The Don Juan Figure in Literature

Chinese

LNC 1101 Elementary Chinese 1 **4 QH**
Designed to acquaint the student with features of spoken and written Mandarin Chinese. Stresses grammar, oral performance, and simple characters. Students who wish to speak another dialect of Chinese should consult instructor for proper placement.

LNC 1102 Elementary Chinese 2 **4 QH**
Continues LNC 1101. Studies grammar and spoken and written forms of the language. *Prereq. LNC 1101.*

LNC 1103 Intermediate Chinese 1 **4 QH**
Continues LNC 1102. Covers more advanced features of the language as well as continued study of characters. *Prereq. LNC 1102.*

LNC 1104 Intermediate Chinese 2 **4 QH**
Continues LNC 1103. Offers more advanced work in grammar, conversation, and characters. *Prereq. LNC 1103.*

LNC 1201 Chinese Composition and Conversation **4 QH**
Allows students to engage actively in communication within various contexts and reviews the more subtle problems of grammar and writing style. This communicative class is for intermediate or advanced learners. It is especially suitable for Asian-American students who have knowledge of certain Chinese dialects (e.g., Cantonese and a level of language competence equal to four quarters in the college Chinese program) and want to learn Mandarin Chinese through reading, writing, and discussion. *Prereq. LNC 1104 or instructor's permission.*

LNC 1502 Backgrounds of Chinese Culture **4 QH**
Introduces students to Chinese culture through the study of a broad array of philosophical, literary, and historical texts as well as selected plays and films. Conducted in English.

LNC 1553 Chinese Film: Gender, Ethnicity, and Urbanity **4 QH**
Engages students in cultural, cross-cultural, intellectual, artistic, and social issues that lead them to an informed understanding of Chinese film. Selected films are organized under the topics of gender, ethnicity, and urbanity. Two outstanding directors, Chen Kaige and Zhang Yimou, are examined closely to illustrate the three topics. Taught in English, may be taken for Chinese credit if special assignments are completed in Chinese.

LNC 1801 Directed Study in Chinese **4 QH**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. *Priority given to language majors and to juniors and seniors.*

French

LNF 1101 Elementary French 1 **4 QH**
Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.

LNF 1102 Elementary French 2 **4 QH**
Continues beginners' exposure to the "four skills"—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq. LNF 1101.*

LNF 1103 Intermediate French 1 **4 QH**
Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq. LNF 1102 or equivalent.*

LNF 1104 Intermediate French 2 **4 QH**
Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq. LNF 1103.*

LNF 1107 Reading French in the Arts and Sciences **4 QH**
Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. *Not a substitute for LNF 1103 or LNF 1104.*

LNF 1111 Elementary French for Business **4 QH**
Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. *LNF 1102 may be taken as a sequel to LNF 1111.*

LNF 1140 Intensive Intermediate French **8 QH**
Continues study of French to further audiolingual skills and improves reading and writing. Seeks to prepare students for advanced French courses. *Prereq. LNF 1102.*

LNF 1181 Elementary French 1–BSIB **4 QH**
Same as LNF 1101, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNF 1182 Elementary French 2–BSIB **4 QH**
Same as LNF 1102, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNF 1186 Intensive Intermediate French–BSIB **4 QH**
Same as LNF 1140, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNF 1201 Intensive Review of French **4 QH**
Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, comprehension, and reading and speaking skills. Required of all French majors, it serves as prerequisite for all other French courses at the 1200 level. Conducted largely in French. Nonmajors are invited as well, as this course is an excellent way to review previous French study.

LNF 1202 Advanced French Proficiency 1 **4 QH**
Focuses on the students' particular grammar needs as well as the nuances of the language. Designed for qualified students who wish to work on improving their proficiency in speaking and writing French through oral reports, class discussions, compositions, and an advanced review of fundamentals. Varied readings in a range of styles—popular to literary—provide insight into French life and culture. Conducted in French. *Prereq. LNF 1201 or equivalent.*

LNF 1203 Advanced French Proficiency 2 **4 QH**
Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken and written French and the study of idioms. *Prereq. LNF 1202 or equivalent.*

LNF 1204 Advanced French Proficiency 3 **4 QH**
Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq. LNF 1203 or equivalent.*

LNF 1225 Introduction to the French-Speaking World **4 QH**
Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and "pop" aspects, of the cultural heritage of the world's French speakers. Focuses mainly, but not exclusively, on France. *Prereq. LNF 1104 or equivalent.*

LNF 1231 Masterpieces of French Literature 1 **4 QH**
Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western and Francophone culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (Core Category II) *Prereq. LNF 1201 or equivalent.*

LNF 1232 Masterpieces of French Literature 2 **4 QH**
Continues LNF 1231, which is not a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings may include an "existential" play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (Core Category II) *Prereq. LNF 1201 or equivalent.*

LNF 1250/LIN 1245 History of the French Language **4 QH**
Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq. Reading knowledge of French or permission of instructor.*

LNF 1281 French Composition and Conversation 1–BSIB **4 QH**
Same as LNF 1201, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNF 1282 French Composition and Conversation 2–BSIB **4 QH**
Same as LNF 1201 with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNF 1285 Topics in French 1–BSIB **4 QH**
This is an advanced intensive language course designed specifically to teach business concepts and vocabulary in French, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNF 1305 French Literature in the Seventeenth Century **4 QH**
Presents a study of the nondramatic literature of seventeenth-century France from the baroque through the classical periods. Covers a rich and diverse body of writing encompassing philosophy, poetry, the table, the novel, and epistolary writing. Among the authors studied are Descartes, Pascal, La Rochefoucauld, La Fontaine, Boileau, Mme. de Sevigne, and Mme. de La Fayette. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1306 French Theatre in the Seventeenth Century **4 QH**
Studies the dramatic literature of seventeenth-century France, from the baroque through the classical periods. Studies tragedy in the works of Corneille and Racine; comedy, in those of Moliere. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1307 French Literature in the Eighteenth Century 1 **4 QH**
Studies the eighteenth century in France, known as the Age of Enlightenment. It was an age of challenge to established authority in all areas and an age of changing ideas and ideals. This intellectual and political vitality is reflected in the representative works of Marivaux, Montesquieu, Prévost, and Voltaire. Class work includes discussions, oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1308 French Literature in the Eighteenth Century 2 **4 QH**
Focuses on the latter half of the century when we begin to see both the achievements brought about by the spirit of enlightenment and the awakening of the romantic sensibility, in such authors as Diderot, Rousseau, St. Pierre, Lacios, and Beaumarchais. Class work includes discussions and oral and written reports. Conducted in French, but English is allowed. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1309 French Literature of the Nineteenth Century 1 **4 QH**
Treats romanticism as a major cultural phenomenon. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1310 French Literature of the Nineteenth Century 2 **4 QH**
Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the style of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in Les Fleurs du Mal, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1311 French Literature of the Twentieth Century 1 **4 QH**
Offers a study of the major movements in the narrative and dramatic prose writers up to 1950, including Proust, A. France, Colette, Anouilh, and Camus. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French. Offered in alternate years. *Prereq. LNF 1232 or equivalent.*

LNF 1312 French Literature of the Twentieth Century 2 **4 QH**
Continues the study of the twentieth-century French literature, with an emphasis on the literary journal from Gide to J. Green. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports in French. Conducted in French. Offered every other year. *Prereq. LNF 1232 or equivalent.*

LNF 1315 French Poetry, Past and Present **4 QH**
Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1405 Topics in French **4 QH**
Provides an in-depth study of specific structural aspects of the French language. Subjects will vary from year to year. *Prereq. LNF 1102 or equivalent.*

LNF 1500 The French-Speaking World **4 QH**
Offers a cultural introduction to the French-speaking world through texts, videos, guest speakers, and classroom discussion. Focuses mainly—but not exclusively—on France and explores a rich cultural heritage, from its traditional to its "pop" aspects. Follows the trail of history, from the Roman conquest of Celtic Gaul to today's partial reshaping of the French national identity through membership in the European Union. Examines the newly articulated concept/construct of "Francophonie" that links globally a vastly diverse world community. Conducted in English.

LNF 1510 Modern Philosophical French Literature in Translation **4 QH**
Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1512 Introduction to Literature **4 QH**
Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, Marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1521 French Film and Culture **4 QH**
Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (Core Category IV)

LNF 1550 Introductory Film Analysis **4 QH**
Provides a basic introduction to film art and compares and contrasts three styles of filmmaking: expressionism, surrealism, and realism as they have been used in Hollywood cinema and the European art cinema. May be taken for French or German credit with permission of the instructor.

LNF 1551 Film Theory **4 QH**
Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about filmmaking practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (Core Category V)

LNF 1557 Modernism: Art, Film, and Literature **4 QH**
Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies futurism, cubism, expressionism, Dada, and surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film.

LNF 1560 Film and Psychoanalysis **4 QH**
Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes, especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

LNF 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

German

LNG 1101 Elementary German 1 **4 QH**
Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 **4 QH**
Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq. LNG 1101 or equivalent.*

LNG 1103 Intermediate German 1 **4 QH**
Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq. LNG 1102 or equivalent.*

LNG 1104 Intermediate German 2 **4 QH**
Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss dramatist Friedrich Durrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq. LNG 1103 or equivalent.*

LNG 1107 Reading German **4 QH**
Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German 1 **4 QH**
Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1140 Intensive Intermediate German **8 QH**
Continues study of German to further audiolingual skills and improves reading and writing. Seeks to prepare students for advanced German courses. *Prereq. LNG 1102.*

LNG 1181 Elementary German 1–BSIB **4 QH**
Same as LNG 1101, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNG 1182 Elementary German 2–BSIB **4 QH**
Same as LNG 1102, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNG 1186 Intensive Intermediate German–BSIB **4 QH**
Same as LNG 1140, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNG 1201 German Composition and Conversation 1 **4 QH**
Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq. LNG 1104 or equivalent.*

LNG 1202 German Composition and Conversation 2 **4 QH**
Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq. LNG 1201 or equivalent.*

LNG 1231 Masterpieces of German Literature 1 **4 QH**
Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Durrenmatt, and Böll. Works read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is expected. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq. LNG 1104 or equivalent.*

LNG 1232 Masterpieces of German Literature 2 **4 QH**
Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq. LNG 1104 or equivalent.*

LNG 1281 German Composition and Conversation 1–BSIB **4 QH**
Same as LNG 1201, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNG 1282 German Composition and Conversation 1–BSIB **4 QH**
Same as LNG 1202, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNG 1285 Topics in German–BSIB **4 QH**
This is an advanced intensive language course designed specifically to teach business concepts and vocabulary in German, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNG 1309 German Literature of the Nineteenth Century **4 QH**
Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso, Klelst, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq. LNG 1232 or equivalent.*

LNG 1311 German Literature of the Twentieth Century **4 QH**
Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq. LNG 1232 or equivalent.*

LNG 1405 Topics in German **4 QH**
Provides an in-depth study of specific structural aspects of the German language. Subjects will vary from year to year. *Prereq. LNG 1102 or equivalent.*

LNG 1554 Modern German Film and Literature **4 QH**
Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the postwar era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Böll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers—Fassbinder, Schlondorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (Core Category IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

Italian

LNI 1101 Elementary Italian 1 **4 QH**
Offers the beginner who wants instruction in the essentials of Italian grammar and opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2 **4 QH**
Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq. LNI 1101 or equivalent.*

LNI 1103 Intermediate Italian 1 **4 QH**
Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq. LNI 1102 or equivalent.*

LNI 1104 Intermediate Italian 2 **4 QH**
Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq. LNI 1103 or equivalent.*

LNI 1201 Italian Composition and Conversation 1 **4 QH**
Aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. For students who have mastered the fundamentals of the language. There will be no study of grammar as such. Conducted entirely in Italian. *Prereq. LNI 1104 or equivalent.*

LNI 1202 Italian Composition and Conversation 2 **4 QH**
Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq. LNI 1201 or equivalent.*

LNI 1311 Italian Literature of the Twentieth Century 1 **4 QH**
Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq. LNI 1232 or equivalent.*

LNI 1312 Italian Literature of the Twentieth Century 2 **4 QH**
Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq. LNI 1232 or equivalent.*

LNI 1510 The Works of Dante in Translation 1 **4 QH**
Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian, and others, may refer to the original for added interest and enrichment. Conducted in English. (Core Category III)

LNI 1511 The Works of Dante in Translation 2 **4 QH**
Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello **4 QH**
Examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 **4 QH each**
Directed Study
Offers students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

Japanese

LNJ 1101 Elementary Japanese 1 **4 QH**
Introduces basic grammar, sentence patterns, and vocabulary of the modern language, with emphasis on spoken Japanese. Includes an introduction to the hiragana and katakana syllabaries in the written component. Designed for students with no previous knowledge of Japanese.

LNJ 1102 Elementary Japanese 2 **4 QH**
Continues LNJ 1101. Provides increasing mastery of the basic skills (oral, aural, reading, and writing) through drills and application exercises. *Prereq. LNJ 1101 or permission of instructor.*

LNJ 1103 Intermediate Japanese 1 **4 QH**
Continues LNJ 1102. Emphasizes primarily the development of oral skills; secondary emphasis on reading skills. Offers students the opportunity to learn basic grammatical patterns, expand vocabulary, and improve communicative skills in modern Japanese. Includes the introduction to kanji characters in the written component. *Prereq. LNJ 1102 or permission of instructor.*

LNJ 1104 Intermediate Japanese 2 **4 QH**
Continues LNJ 1103. Expands and refines the basic skills through a variety of in-class activities and texts that further expand cultural competence. *Prereq. LNJ 1103 or permission of instructor.*

LNJ 1500 Japanese Popular Culture **4 QH**
Provides an introduction to Japanese popular culture through critical analysis of mass media, such as film, television, comics, and animation. Investigates various social and cultural issues, such as gender, family, and education. Films and videos supplement readings. Conducted in English. (Core Category V)

Linguistics

LNL 1220/LIN 1220 Introduction to Phonetics and Phonology **4 QH**
Explores the acoustic and articulatory basis of phonology. Emphasizes hands-on experience with standard areas in modern phonology, including phonetics, phonetic variation, natural classes of sounds, phoneme alternations, rule systems, and prosodic phonology. Introduces major contemporary theories including autosegmental phonology and feature geometry.

LNL 1235/LIN 1235 Applied Linguistics **4 QH**
Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics, but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.

LNL 1240/LIN 1240 Bilingualism **4 QH**
Focuses on the fact that half of the world's population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in their languages; that bilingual children suffer from cognitive impoverishment; that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.

LNL 1260/LIN 1260 Introduction to Romance Linguistics **4 QH**
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object-pronoun placement, word order, creolization, and subject-pronoun use. Conducted in English. *Prereq. Reading knowledge of one Romance language or permission of instructor.*

Russian

LNR 1101 Elementary Russian 1 **4 QH**
Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 **4 QH**
Continues grammar study; oral and written exercises. *Prereq. LNR 1101.*

LNR 1103 Intermediate Russian 1 **4 QH**
Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq. LNR 1102.*

LNR 1104 Intermediate Russian 2 **4 QH**
Continues LNR 1103. *Prereq. LNR 1103.*

LNR 1201 Russian Composition and Conversation 1 **4 QH**
Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq. LNR 1104 or equivalent.*

LNR 1202 Russian Composition and Conversation 2 **4 QH**
Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq. LNR 1201 or equivalent.*

LNR 1205 Stylistics and Advanced Grammar Analysis 1 **4 QH**
Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq. LNR 1104 or permission of instructor.*

LNR 1309 Russian Short Stories of the Nineteenth Century **4 QH**
Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq. LNR 1104 or equivalent.*

LNR 1315 Russian Expository Prose **4 QH**
Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq. LNR 1104.*

LNR 1316 Russian Folklore **4 QH**
Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq. LNR 1104.*

LNR 1500 Backgrounds in Russian Culture **4 QH**
Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in English Translation **4 QH**
Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences. Conducted in English.

LNR 1511 Russian Literature in English Translation **4 QH**
A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others. Conducted in English.

LNR 1550 History of Soviet Cinema **4 QH**
Surveys the emergence and development of the film industry in the USSR. Examines the political, economic, ideological, and artistic sources of Soviet cinema and their relationship to Russian culture and history. Directors considered include Eisenstein, Vertov, Pudovkin, Dovzhenko, Kozintsev, and Kalatozov. (Core Category IV)

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 **4 QH each**
Directed Study
Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 **4 QH**
Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 **4 QH**
Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq. LNS 1101 or equivalent.*

LNS 1103 Intermediate Spanish 1 **4 QH**
Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq. LNS 1102 or equivalent.*

LNS 1104 Intermediate Spanish 2 **4 QH**
Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq. LNS 1103 or equivalent.*

LNS 1105 Conversational Spanish 1 **4 QH**
Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq. LNS 1104 or equivalent; open to nonmajors only.*

LNS 1106 Conversational Spanish 2 **4 QH**
Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be accepted after having completed only LNS 1104. *Prereq. LNS 1105 or equivalent; open to nonmajors only.*

LNS 1130 Intensive Spanish **8 QH**
Encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1140 Intensive Intermediate Spanish **8 QH**
Continues study of Spanish to further audiolingual skills and improves reading and writing. Seeks to prepare students for advanced Spanish courses. *Prereq. LNS 1102.*

LNS 1181 Elementary Spanish 1–BSIB **4 QH**
Same as LNS 1101, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNS 1182 Elementary Spanish 2–BSIB **4 QH**
Same as LNS 1102, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNS 1186 Intensive Intermediate Spanish–BSIB **4 QH**
Same as LNS 1140, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNS 1201 Spanish Composition and Conversation 1 **4 QH**
Offers practice in writing and speaking Spanish, including written and oral résumés, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 **4 QH**
Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq. LNS 1201 or equivalent.*

LNS 1203 Advanced Spanish Proficiency 1 **4 QH**
Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. Designed for those preparing to enter the teaching profession as well as qualified advanced students. *Prereq. Permission of instructor.*

LNS 1204 Advanced Spanish Proficiency 2 **4 QH**
Continues the aims and goals of LNS 1203. *Prereq. LNS 1203 and permission of instructor.*

LNS 1231 Masterpieces of Spanish Literature 1 **4 QH**
Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (Core Category II) *Prereq. LNS 1104 or equivalent.*

LNS 1232 Masterpieces of Spanish Literature 2 **4 QH**
Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the Generation of '98. Conducted in Spanish. (Core Category II) *Prereq. LNS 1104 or equivalent.*

LNS 1250 History of the Spanish Language **4 QH**
Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq. Reading knowledge of Spanish or permission of instructor.*

LNS 1281 Spanish Composition and Conversation 1–BSIB **4 QH**
Same as LNS 1201, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNS 1282 Spanish Composition and Conversation 2–BSIB **4 QH**
Same as LNS 1202, with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNS 1285 Topics in Spanish 1–BSIB **4 QH**
This is an advanced intensive language course designed specifically to teach business concepts and vocabulary in Spanish with an emphasis on the Bachelor of Science in International Business curriculum. *Prereq. BSIB students only.*

LNS 1301 Spanish Medieval Literature **4 QH**
Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines nonliterary texts such as wills and laws for their historical and literary relevance.

LNS 1306 Spanish Golden Age Theatre **4 QH**
Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1309 Spanish Literature of the Nineteenth Century 1 **4 QH**
Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1310 Spanish Literature of the Nineteenth Century 2 **4 QH**
Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq. LNS 1232 or equivalent.*

LNS 1311 Spanish Literature of the Twentieth Century 1 **4 QH**
Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq. LNS 1232 or equivalent.*

LNS 1312 Spanish Literature of the Twentieth Century 2 **4 QH**
Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayla, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq. LNS 1232 or equivalent.*

LNS 1315 Latin American Literature 1 **4 QH**
Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Díaz, Sor Juana, Jorge Isaacs, and José Hernández. *Prereq. LNS 1204 or equivalent.*

LNS 1316 Latin American Literature 2 **4 QH**
Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos, and Vargas Llosa. *Prereq. LNS 1204 or equivalent.*

LNS 1400 Spanish Seminar **4 QH**
Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.

LNS 1401 Seminar in Spanish Literature **4 QH**
Focuses on a selected group of Galdos's novels through detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; non-majors who show exceptional background in Spanish may be admitted. *Prereq. Permission of instructor.*

LNS 1402 Seminar in the Contemporary Spanish Theatre **4 QH**
Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground" playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq. LNS 1232 or permission of instructor.*

LNS 1500 Backgrounds of Spanish Culture **4 QH**
Examines chronologically the forces that have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (Core Category IV)

LNS 1501 Backgrounds of Latin American Culture **4 QH**
Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (Core Category IV)

LNS 1505 Cervantes and His Times **4 QH**
Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Interludes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (Core Category III)

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance **4 QH**
Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature **4 QH**
Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature **4 QH**
Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (Core Category III)

LNS 1550 Spanish Civil War in Spanish Film **4 QH**
Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936–1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (Core Category III)

LNS 1551 Masterpieces of Latin American Film **4 QH**
Examines prize-winning Latin American films based on actual events, such as those that occurred during the Argentine military dictatorship of the 1970s, or works of fiction by well-known authors, such as Nobel Prize winner García Márquez. These films ably depict the history and culture of these countries. The course is conducted in English and the films are in Spanish with English subtitles.

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805 Directed Study **4 QH each**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

LNS 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

Music

MUS 1100 Introduction to Music **4 QH**
Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (Core Category II)

MUS 1101 Music: A Listening Experience **4 QH**
Offers a self-paced, computer-mediated, Internet-communicated introduction to music course. Students learn how to listen to classical music. No previous musical knowledge is required or assumed. Draws all musical examples from the masterworks of Western classical music. No classes are scheduled for this course and all learning takes place at a computer, either in one of the on-campus com-

puter labs or at any other location. For more information see this course's home page at: http://multimedia.dac.neu.edu/aom/ (Core Category II)

MUS 1103 Music as a Social Expression **4 QH**
Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (Core Category III)

MUS 1104/AFR 1153 Survey of African-American Musics **4 QH**
Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles.

MUS 1105 Music of the U.S.A. **4 QH**
Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (Core Category V)

MUS 1106 Women in Music **4 QH**
Examines the multifaceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger. (Core Category VI)

MUS 1107 Principles of Music Literature **4 QH**
Examines the evolution and application of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. *Prereq. MUS 1201, music majors only, or permission of instructor.*

MUS 1109 Introduction to Music and the Arts **4 QH**
Offers an interdisciplinary approach to music and other arts including at least one of the following as a companion art: painting, film, or theater. Examines works of art from various periods in the context of the cultures. Supplements regular classes with visits to art museums and live performances. (Core Category II)

MUS 1110 Music in Popular Culture **4 QH**
Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music **4 QH**
Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112/AFR 1451 Jazz **4 QH**
Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audiovisual presentations. Also considers the sociocultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History **4 QH**
Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (Core Category III) *Prereq. MUS 1201.*

MUS 1121 Medieval and Renaissance Music **4 QH**
Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era **4 QH**
Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era **4 QH**
Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven.

MUS 1124 Music of the Romantic Era **4 QH**
Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (Core Category V)

MUS 1125 Twentieth-Century Music **4 QH**
Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neoclassicism, and other major trends in music of the twentieth century. (Core Category V)

MUS 1126 New Directions in Music **4 QH**
Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

MUS 1130 The Symphony **4 QH**
Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.

MUS 1131 Piano Music: The Great Composers and Performers **4 QH**
Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.

MUS 1132 Introduction to Opera **4 QH**
Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.

MUS 1133 Great Choral Literature **4 QH**
Analyzes sacred and secular choral literature from medieval to contemporary times.

MUS 1134 Music and Poetry **4 QH**
Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (Core Category III)

MUS 1139 Film Music **4 QH**
Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.

MUS 1140 Mozart **4 QH**
Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.

MUS 1144 Debussy and the Music of Paris **4 QH**
Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.

MUS 1145 Beethoven **4 QH**
Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (Core Category III)

MUS 1146 George Gershwin **4 QH**
Studies the life and works of George Gershwin (1898–1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."

MUS 1161 Music Therapy 1 **4 QH**
Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

MUS 1162 Music Therapy 2 **4 QH**
Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq. MUS 1161.*

MUS 1163 Sound Health **4 QH**
Gives both musicians and nonmusicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.

MUS 1165 The Music Industry 1 **4 QH**
Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who are invited to lecture in class.

MUS 1166 The Music Industry 2 **4 QH**
Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, music merchandising, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq. MUS 1165.*

MUS 1167 Music Administration **4 QH**
Introduces music management, including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq. MUS 1166 or permission of instructor.*

MUS 1170 Music and Technology **4 QH**
Studies the applications of contemporary computing technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers. *For nonmusic majors.*

MUS 1171 Computer Literacy for Musicians **4 QH**
Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum. *Prereq. Music majors only.*

MUS 1172 Introduction to Music Recording **4 QH**
Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation. *Prereq. Music majors only or permission of instructor.*

MUS 1173 Music Recording 2 **4 QH**
Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq. MUS 1172. Music majors only or permission of instructor.*

MUS 1174 Music Production for Radio **4 QH**
Introduces the core skills required for production of music programs for radio. Instructs students in technical, contextual, and compositional aspects of music production including transmission chains and signal processing, audience targeting using Modal techniques and music demographics analysis, selecting talent, and structuring a program clock. *This course is open to music industry majors and music industry minors.*

MUS 1175 Music and Technology 2 **4 QH**
Continues MUS 1170 and MUS 1171. Presents advanced topics related to music composition with computers. Emphasizes the completion of original music works that employ various methods of sound synthesis, such as additive synthesis, frequency modulation, subtractive synthesis, physical modeling, resynthesis, and MIDI. Students will use both hardware and software production tools for the completion of these works. *Prereq. MUS 1170 or MUS 1171 or permission of instructor.*

MUS 1176 History of Electronic Music **4 QH**
Exposes students to the history of electronic music from its conception in the late 1800s to the present day. Requires extensive listening and analysis of representative works to ensure students have the opportunity to acquire a clear understanding of the music in question. Studies technical innovations that affected the creation of electronic compositions. *Prereq. MUS 1175.*

MUS 1180 Introduction to World Music **4 QH**
Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.

MUS 1181/AFR 1156 Music of Africa **4 QH**
Provides insight into the many and varied musical styles found on the continent of Africa. Examines instrumental and vocal traditions using strategies and approaches appropriate for the study of music worldwide. Focuses on examining the music from the perspective of its creators, as well as on the roles and functions of the music in human life. Includes historical and contemporary musical genres.

MUS 1182 Music of the Middle East **4 QH**
Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

MUS 1183 Music of East Asia **4 QH**
Seeks to broaden students knowledge of Asian cultures by providing a glimpse into both traditional and contemporary musical life of countries in the Far East, South, and Southeast Asia through the study of music. Offers students the opportunity to learn about music as a human activity and as a form of sociocultural expression through the interpretation of historical, social, and cultural aspects of a society. Study of these aspects elucidates the aesthetic parameters of why a music sounds a certain way. Emphasizes development of basic listening skills. (Core Category IV)

MUS 1184 Music of Latin America and the Caribbean **4 QH**
Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertories, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism. (Core Category IV)

MUS 1185 The Music of the Jewish People **4 QH**
Investigates the role that music has played in Jewish life from ancient to modern times. Topics to be studied include: music in the time of *The Bible*, Rabbinic attitudes toward music, music and mysticism, the development of the modes for prayer and scriptural cantillation, church and synagogue music compared, music of the holidays and the life cycle, folk and popular music in the diaspora, the development of art music in the modern era, and music in modern Israel. (Core Category IV) *Prior knowledge of music is not required.*

MUS 1200 Fundamentals of Music **4 QH**
Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms.

MUS 1201 Music Theory 1 **4 QH**
Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. *Prereq. MUS 1200 or permission of instructor.* (Core Category II)

MUS 1202 Music Theory 2 **4 QH**
Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. *Prereq. MUS 1201 or permission of instructor.*

MUS 1203 Music Theory 3 **4 QH**
Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and nondiatonic harmony. *Prereq. MUS 1202 or permission of instructor.*

MUS 1204 Music Theory 4 **4 QH**
Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. *Prereq. MUS 1203 or permission of instructor.*

MUS 1205 Music Composition **4 QH**
Exposes students to the basic methods of music composition. Analyzes examples from music literature to gain an understanding of the methods employed; students complete several compositions of their own. *Prereq. MUS 1203.*

MUS 1209 Functional Piano **4 QH**
Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq. MUS 1202.*

MUS 1210 Music Theory Lab **1 QH**
Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.

MUS 1211 Sight-singing **4 QH**
Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq. MUS 1201 or equivalent.*

MUS 1230 Chorus **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1231 Band **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1232 Chamber Ensembles and Orchestra **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1233 Early Music Players **1 QH**
Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq. Permission of instructor.*

MUS 1234/AFR 1234 Jazz Ensemble **1 QH**
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American music. Students are admitted to the course by permission of the instructor following an interview and/or audition. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Band and the NU Jazz Combo are represented together in this course.

MUS 1241 Piano Class 1 **4 QH**
Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

MUS 1242 Piano Class 2 **4 QH**
Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq. MUS 1241.*

MUS 1244 Voice Class 1 **4 QH**
Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq. Permission of instructor.*

MUS 1247 Guitar Class 1 **4 QH**
Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

MUS 1250 Conducting **4 QH**
Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq. Ability to read music and to sing or play an instrument.*

MUS 1261, MUS 1262 Music Lessons 1 and 2 **1 QH each**
Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee. *Prereq. Music majors only and permission of instructor.*

MUS 1265/AFR 1233 Jazz Improvisation 1 **4 QH**
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

MUS 1301 Form and Analysis 1 **4 QH**
Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq. MUS 1203.*

MUS 1302 Form and Analysis 2 **4 QH**
Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq. MUS 1203.*

MUS 1360 Artist Management **4 QH**
Provides an in-depth investigation of the field of musical artist management. Explores the artist-manager relationship, the management contract, artist evaluation, image formulation, the artist's development team, achieving a recording contract, merchandising, endorsements, sponsorships, touring, and financial management. *Prereq. MUS 1166 or permission of instructor.*

MUS 1361 The Record Industry **4 QH**
Examines the domestic and international record industry. Topics include industry structure, business and legal affairs, the recording contract, royalties, manufacturing, distribution, promotion, publicity, advertising, licensing, and piracy. Offers students the opportunity to explore major record labels and independent labels. Addresses the past, present, and future. *Prereq. MUS 1166.*

MUS 1362 Music Merchandising **4 QH**
Provides a thorough examination of business organization, marketing, distribution, and sales techniques in the diverse field of music merchandising. Investigates market sectors such as musical instruments; professional, semiprofessional, and home audio equipment; the recording industry; and print music. Presents guest speakers from various sectors of the music industry. *Prereq. MUS 1166 or permission of instructor.*

MUS 1365 Seminar in the Music Industry **4 QH**
A capstone course for music industry students. Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to reflect upon, distill, and apply knowledge accumulated in prior courses and previous experiential learning. This reflection and application occurs through substantial writing assignments and classroom discussion. *Fulfills the college's experiential education requirement for music majors whose concentration is music industry. Prereq. MUS 1166 and senior standing.*

MUS 1366 Copyright Law for Musicians **4 QH**
Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. *Prereq. MUS 1166 or permission of instructor.*

MUS 1367 Computer Applications in Music Business **4 QH**
Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq. MUS 1166.*

MUS 1370 Seminar in Performance Practice **4 QH**
Provides students with the opportunity to reflect on their research as it applies to their performances. Students will be expected to present written reports to be discussed at the seminar. Students will also be asked to research and write the program notes for their performances. *Fulfills the college's experiential education requirement for literature and performance majors. Prereq. MUS 1203, MUS 1241, MUS 1421, and one of the following: MUS 1422, MUS 1423, and MUS 1424.*

MUS 1421 Historical Traditions 1: American Music **4 QH**
Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical music. *Prereq. MUS 1107.*

MUS 1422 Historical Traditions 2 **4 QH**
Provides an overview of early Western music, from the middle ages through the seventeenth century, in cultural and stylistic contexts. Concentrates on classical music but also deals with music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1423 Historical Traditions 3 **4 QH**
Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq. MUS 1421.*

MUS 1424 Historical Traditions 4 **4 QH**
Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular music as well. *Prereq. MUS 1421.*

MUS 1425 Historical Traditions 5 **4 QH**
Examines the historical musical traditions of selected music-cultures of Africa, Asia, Oceania, and indigenous cultures of the Americas. Provides an in-depth study of the evolution of the selected music-cultures, focusing on the following considerations: ethnomusicological historical approaches to the study of music-cultures including music and the belief system, aesthetics, context for music, repertoires, organization of musical sound, instruments and performance techniques, and learning and transmission of musical knowledge (performance and nonperformance). Explores why music is different among the world's peoples; what music of the past sounded like, its impact on how music sounds today; what happens to music over time and space; and why music should be preserved and by whom. *Prereq. MUS 1421.*

MUS 1461 Applied Music Lessons **3 QH**
Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq. Permission of instructor and department chair.*

MUS 1700 Introduction to Music (Honors) **4 QH**
Honors equivalent of MUS 1100.

MUS 1709 Introduction to Music and the Arts (Honors) **4 QH**
Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study **4 QH each**
Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813 Junior/Senior Honors Project **4 QH each**
For details, contact the honors office.

MUS 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

MUS 1899 Advanced Television Production **4 QH**
Provides students the opportunity to produce a half-hour television show on Cablevision of Boston. Students are responsible for creating, shooting, and editing the show, as well as assembling necessary cast and crew. Students should have a fundamental knowledge of both videotape shooting and editing.

Courses at the New England Conservatory
Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit is granted. For information, contact the chair of the department.

Philosophy and Religion

PHL 1100 Introduction to Philosophy **4 QH**
Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (Core Category II)

PHL 1110 Introduction to Religion **4 QH**
Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the world in a different way, and how that leads to distinctive ways of life. (Core Category II)

PHL 1130 Ethics: East and West **4 QH**
Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (Core Category V)

PHL 1135 Philosophical Problems of Law and Justice **4 QH**
Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question, deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (Core Category VI)

PHL 1140 Social and Political Philosophy **4 QH**
Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (Core Category V) *Prereq. 4 QH philosophy.*

PHL 1160 Philosophical Problems of Economic Justice **4 QH**
Focuses on the questions: What is economic justice? And, What features must a society have in order to be economically just? Readings include classical and contemporary works by philosophers and other thinkers. Analyzes and evaluates economic systems such as capitalism, socialism, and the welfare state.

PHL 1165 Moral Problems in Medicine **4 QH**
Introduces students to ethical theories, moral principles, and principles of distributive justice. Uses these theories and principles to analyze the moral problems that arise in the medical context. Topics considered are: euthanasia, medical paternalism, informed consent, patient confidentiality, the duty to warn, the right to die and advanced directives, the ethics of medical research, abortion, and human genetics. Also examines the right to health care, distribution of scarce medical resources, and the ethical implications of health maintenance organizations.

PHL 1170 Business Ethics **4 QH**
Examines ethical principles and considerations involved in making moral business decisions. Studies the foundation of basic ethical viewpoints and analyzes specific characteristics of business life through case studies and examples. Includes issues such as corporate responsibility, employee rights, conflict of interest and roles, advertising and information disclosure, environmental issues, and self- and governmental regulation.

PHL 1180 Environmental Ethics **4 QH**
Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (Core Category VI)

PHL 1200 Introduction to Logic 1* **4 QH**
Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (Core Category II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2* **4 QH**
Continues the study of the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (Core Category II)

PHL 1215/LIN 1215 Symbolic Logic* **4 QH**
Focuses on the syntax and semantics of propositional logic and first-order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (Core Category II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy **4 QH**
Examines the philosophy of classical Greece. Considers philosophers with distinctive views of the nature of the material world and of the person, so the course covers both metaphysical and moral writings. Texts are primarily from Socrates, Plato, and Aristotle. Also gives some consideration to early Greek philosophers, to the Sophists, and to later developments. (Core Category III)

PHL 1230 Modern Philosophy **4 QH**
Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (Core Category III) *Prereq. 8 QH philosophy.*

PHL 1243 Existentialism **4 QH**
Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq. 4 QH philosophy.*

PHL 1245 Analytic Philosophy **4 QH**
Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq. 8 QH philosophy.*

PHL 1250 Chinese Religion **4 QH**
Offers a study of Chinese philosophy in the ancient period (until 221 B.C.E.). Emphasizes Confucianism, Taoism, and the I Ching. Covers the Logicians, the Mohists, and the Legalists.

PHL 1265 Latin American Religions **4 QH**
Explores the major religious traditions of Latin America—indigenous, Christian, and African—and how they have influenced each other, resulting in the syncretisms and religious cultures of our own day. Uses historical texts, narrative, art, interpretive essays, and music to look at the dynamics of that interplay, exploring in particular the factors that have shaped what was introduced, accepted, rejected, and retained. (Core Category III)

PHL 1275 Eastern Religions **4 QH**
Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Hahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (Core Category IV)

PHL 1280 Islam **4 QH**
Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (Core Category IV)

PHL 1285 Introduction to Jewish Religion and Culture **4 QH**
Explores the basic features of Judaism in the ancient, Rabbinic, and Modern periods. Employs an historical-critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.

PHL 1290 Cults and Sects **4 QH**
Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions. (Core Category V)

PHL 1293 Eastern and Nontraditional Philosophy **4 QH**
Offers a multicultural look, using primary sources, at the diverse perspectives available to address philosophical issues. Perspectives include African, Asian, Latin American, feminist, womanist, Amerindian, and African-American views. Includes such topics as self-identity, reality, truth, knowledge, ethics, social and political arrangements, and perceptions of divinity.

*Students should take either PHL 1200 and PHL 1203 *or* PHL 1200 and PHL 1215. Credit will not be given for all three courses.

PHL 1315 Understanding the Bible **4 QH**
Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (Core Category III)

PHL 1316 Interpreting the Bible **4 QH**
Offers students the opportunity to understand the Bible as a document that is continually interpreted by believing communities in their own social and religious contexts. Studies various interpretations of such passages as the creation story, resurrection accounts, themes in Revelation, and the Exodus event. *Prereq. PHL 1315.*

PHL 1320 The Meaning of Death **4 QH**
Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (Core Category V)

PHL 1325 Responses to the Holocaust **4 QH**
Explores the variety of responses to the mass death brought on by the Holocaust. Uses the five stages of dying that Elizabeth Kubler-Ross outlines both to examine the reactions of Holocaust victims to imminent death and to understand the way in which survivors attempted to cope with bereavement. Examines the responses of theology literature as well as relevant ethical issues.

PHL 1335 Moral Philosophy **4 QH**
Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq. 4 QH philosophy or religion or permission of instructor.* (Core Category V)

PHL 1340 Aesthetics **4 QH**
Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq. 4 QH philosophy.*

PHL 1345 Philosophy of Religion **4 QH**
Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq. 4 QH philosophy.*

PHL 1350 Philosophy of Human Nature **4 QH**
Considers various attributes of human beings such as intelligence, sexuality, and language in the context of biological, psychological, linguistic, and philosophical views of human nature. Topics and disciplines will change from year to year. (Core Category V)

PHL 1360 Philosophy and Literature **4 QH**
Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors.

PHL 1370 The Meaning of Life **4 QH**
Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1400 Theory of Knowledge **4 QH**
Focuses on questions about the nature and justification of claims to knowledge. Is there genuine knowledge? How do we tell when a belief or theory is sufficiently justified to count as knowledge? Discusses theories such as various forms of rationalism, empiricism, and skepticism. Requires careful reading of works by such influential thinkers as René Descartes, Bertrand Russell, A.J. Ayer, and T.S. Kuhn. *Prereq. 16 QH philosophy.*

PHL 1405 Metaphysics **4 QH**
Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq. 8 QH philosophy.*

PHL 1410 Philosophy of Science **4 QH**
Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq. 4 QH philosophy.*

PHL 1415 Advanced Logic **4 QH**
Studies the major results in the metatheory of first-order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq. PHL 1215.*

PHL 1435 Philosophy of Mind **4 QH**
Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq. 4 QH philosophy.*

PHL 1440/LIN 1440 Philosophy of Language **4 QH**
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor. *Prereq. Permission of instructor.*

PHL 1550, PHL 1551, PHL 1552, PHL 1553 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

PHL 1700 Introduction to Philosophy (Honors) **4 QH**
Honors equivalent of PHL 1100.

PHL 1720 The Meaning of Death **4 QH**
Honors equivalent of PHL 1320.

PHL 1740 Social and Political Philosophy (Honors) **4 QH**
Honors equivalent of PHL 1140.

PHL 1800 Directed Study **4 QH**
Those interested in the directed study program should meet with the department chair. *Prereq. permission of instructor.*

PHL 1801 Research Internship **4 QH**
Seeks to familiarize students with at least one of the three stages of an advanced research project: 1) securing research funds, 2) substantive research and research techniques, and 3) publication and presentation of research results. Students may opt to take this practicum in conjunction with a writing project of their own. In addition to helping students develop additional knowledge of the research resources that are available, this course is intended to develop their critical skills. *Fulfills the College of Arts and Sciences experiential education requirement for philosophy majors. Prereq. Permission of supervising instructor and 24 QH of PHL courses.*

PHL 1802 Teaching Internship **4 QH**
Centers around two issues central to the pedagogical enterprise; namely, course design and implementation. Involves discussions with the supervisor, observation of teaching techniques, test development, discussion leading, and lecture presentation. Students work with the instructor in one course, assist in syllabus development, observe and lead several discussions, and present a lecture or lectures on one topic to be determined during the syllabus development. *Fulfills the College of Arts and Sciences experiential education requirement for philosophy majors. Prereq. Permission of supervising instructor and 24 QH of PHL courses.*

PHL 1881 Great Philosophers Seminar **4 QH**
Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq. 12 QH of philosophy courses.*

PHL 1888, 1889 Experiential Education Directed Study **4 QH each**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it in fulfilling their experiential education requirement.

PHL 1890 Seminar in Religion **4 QH**
Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq. 12 QH of philosophy and religion courses.*

PHL 1891 Major Figures in Religious Studies **4 QH**
Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq. 12 QH of religious studies.*

PHL 3265 Issues in Medical Ethics **4 QH**
Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq. Permission of instructor.*

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy 1 **4 QH**
Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (Core Category II)

PHY 1121 Introduction to Science 1 **4 QH**
Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that compose matter. (Core Category II)

PHY 1132 From Flashlights to Fusion: Energy and the Environment **4 QH**
Provides nonscience students with a practical knowledge of our present use of the earth's energy resources and the environmental consequences. Topics include solar energy, nuclear energy, global warming, oil politics, pollution, and electric cars. This course draws upon multimedia presentations, a tour of MIT's fusion reactor, and WEB-based sources. No knowledge of physics is assumed. (Core Category VI)

Introductory Physics Courses

PHY 1191 Physics for BSET 1 **4 QH**
Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq. MTH 1191, which may be taken concurrently; BSET majors only.*

PHY 1192 Physics for BSET 2 **4 QH**
Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq. PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.*

PHY 1193 Physics for BSET 3 **4 QH**
Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq. PHY 1192; BSET majors only.*

PHY 1201 Physics for the Life Sciences 1 **4 QH**
Focuses on vector addition of force, principles of static; Newton's second law, kinetic and potential energy. To take the lab for this course, register for PHY 1501 concurrently. (Core Category II)

PHY 1202 Physics for the Life Sciences 2 **4 QH**
Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (Core Category II) *Prereq. PHY 1201.*

PHY 1203 Physics for the Life Sciences 3 **4 QH**
Focuses on temperature, gas laws, pressure, static properties of fluids, fluid flow, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq. PHY 1201.*

PHY 1205 Physics for the Health Sciences **5 QH**
An integrated lecture and laboratory course for Cardiopulmonary Sciences students. Focuses on two subjects: (1) fluids, including pressure, Archimedes' principle, Pascal's principle, Bernoulli's equation, viscosity, and Poiseuille's equation, with applications to body composition and to the circulatory and pulmonary systems; and (2) electricity, including electrostatics, DC and AC circuits, with applications to the electrophysiology of muscles and nerves. The laboratory experiments are closely integrated with the lecture material. *Prereq. PHY 1201 or equivalent.*

PHY 1221 Physics for Science and Engineering Students 1 **4 QH**
The first quarter of a four-quarter sequence intended primarily for science and engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions, and rotations. *Prereq. MTH 1123 or equivalent, which may be taken concurrently.*

PHY 1222 Physics for Science and Engineering Students 2 **4 QH**
Continues PHY 1221. Focuses on rotation equilibrium, angular momentum, harmonic motion, fluid mechanics, wave motion, sound, and optics. *Prereq. PHY 1221 and MTH 1124 or equivalent, which may be taken concurrently.*

PHY 1223 Physics for Science and Engineering Students 3 **4 QH**
Focuses on electricity, electric fields, electric potential, Ohm's law, simple circuits, magnetic fields, Faraday's law and induction, and Maxwell's equations. *Prereq. PHY 1222 and MTH 1125 or equivalent, which may be taken concurrently.*

PHY 1224 Physics for Science and Engineering Students 4 **4 QH**
Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schroedinger equation, wave functions, the hydrogen atom, solids, nuclear and atomic physics). *Prereq. PHY 1221, PHY 1222, and PHY 1223 or equivalent.*

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1 **1 QH**
Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq. PHY 1191 concurrently; BSET majors only.*

PHY 1197 Physics BSET Laboratory 2 **1 QH**
Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq. PHY 1196; PHY 1192 concurrently; BSET majors only.*

PHY 1198 Physics BSET Laboratory 3 **1 QH**
Covers experiments from PHY 1193. Lab fee. *Prereq. PHY 1193 concurrently; BSET majors only.*

PHY 1501 Physics Laboratory for the Life Sciences 1 **1 QH**
Accompanies PHY 1201. *Prereq. PHY 1201 concurrently.*

PHY 1502 Physics Laboratory for the Life Sciences 2 **1 QH**
Accompanies PHY 1202. *Prereq. PHY 1501; PHY 1202 or PHY 1203 concurrently.*

PHY 1521 Physics Laboratory for Science and Engineering Students 1 **1 QH**
The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. *Prereq. PHY 1221 concurrently.*

PHY 1522 Physics Laboratory for Science and Engineering Students 2 **1 QH**
Continues PHY 1521. *Prereq. PHY 1521; PHY 1222 concurrently.*

PHY 1533 Physics Laboratory for Science Majors 3 **1 QH**
Focuses on lab experiments related to topics covered in PHY 1233. *Prereq. PHY 1522; PHY 1223 concurrently.*

Advanced Physics and Astronomy Courses

PHY 1300 Physics with Computers **4 QH**
Introduces using computer software to solve scientific problems. Uses spreadsheet programs and MATLAB to discuss examples such as motion damped by friction, resonance phenomena, simulation of exponential decay processes, period doubling, and chaos. *Prereq. PHY 1223 or equivalent, or permission of instructor.*

PHY 1302 Electric and Magnetic Fields **4 QH**
Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials; Maxwell's equations in integral form.

PHY 1303 Modern Physics **4 QH**
Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. Introduces the spacial theory of relativity. *Prereq. PHY 1223 or equivalent.*

PHY 1304 Mathematical Physics **4 QH**
Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq. MTH 1244 and PHY 1233; MTH 1246 concurrently.*

PHY 1305 Thermodynamics and Kinetic Theory **4 QH**
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq. PHY 1224 or PHY 1233, and MTH 1244.*

PHY 1401 Classical Mechanics **4 QH**
Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq. PHY 1301 and MTH 1245.*

PHY 1402 Electricity and Magnetism 1 **4 QH**
Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq. PHY 1302 and PHY 1304 or equivalent.*

PHY 1403 Electricity and Magnetism 2 **4 QH**
Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq. PHY 1402 or equivalent.*

PHY 1404 Wave Motion and Optics **4 QH**
Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq. PHY 1302.*

PHY 1411 Introduction to Astrophysics and Cosmology **4 QH**
Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectroscopes, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq. Three quarters of elementary physics.*

PHY 1413 Introduction to Nuclear Physics **4 QH**
Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq. PHY 1303.*

PHY 1414 Introduction to Solid State Physics **4 QH**
Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq. CHM 1383 or PHY 1303; and PHY 1305 or equivalent.*

PHY 1415 Quantum Mechanics 1 **4 QH**
Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq. CHM 1383 or PHY 1303; and PHY 1304 or equivalent.*

PHY 1416 Quantum Mechanics 2 **4 QH**
Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq. PHY 1415.*

PHY 1421 Biological Physics 1 **4 QH**
Examines the physical principles of bioelectricity. Covers the anatomical and physiological basis of signal propagation in nerve and muscle cells, the active properties of cell membranes, electrophysiological models of charge and ion transport across membranes, action potential propagation in excitable tissues, the behavior of bioelectric and biomagnetic fields in and around the volume conductors formed by the body, and the theoretical foundations of electrocardiology and electroencephalography. *Prereq. PHY 1302, PHY 1304 or equivalent, and BIO 1355 or permission of instructor.*

PHY 1423 Medical Physics **4 QH**
Introduces the physical principles and basic mathematical methods underlying the various modalities of medical imaging. These include computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), single-photon emission tomography (SPECT), and ultrasound. Covers nuclear physics and the interaction of radiation with biological matter with application to radiation therapy. *Prereq. PHY 1302, PHY 1304 or equivalent, and BIO 1421 or permission of instructor.*

PHY 1451 Medical Imaging **4 QH**
Part 1 of a seminar series conducted by expert practitioners from Boston-area hospitals. Examines the clinical applications of medical imaging methods (CT, MRI, and PET). Includes site visits to local hospitals and medical instrumentation companies. *Prereq. PHY 1423.*

PHY 1452 Radiation Therapy **4 QH**
Part 2 of a seminar series conducted by expert practitioners from Boston-area hospitals. Examines the clinical applications of radiation therapy. *Prereq. PHY 1423.*

PHY 1453 Applications of Lasers in Medicine **4 QH**
Part 3 of a seminar series conducted by expert practitioners from Boston-area hospitals. Examines the clinical applications of lasers and optical techniques. *Prereq. PHY 1404 and PHY 1423.*

PHY 1551 Electronics for Scientists 1 **4 QH**
With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2 **4 QH**
Continues PHY 1551. *Prereq. PHY 1551.*

PHY 1555 Wave Laboratory **4 QH**
Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and microwaves illustrate these problems. *Prereq. PHY 1224 or PHY 1302.*

PHY 1557 Advanced Physics Laboratory **4 QH**
Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq. PHY 1551 and PHY 1552.*

PHY 1561 Project Laboratory **4 QH**
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student is supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is taken in successive winter and spring quarters.) *Prereq. Permission of instructor.*

PHY 1711 Introduction to Astronomy 1 (Honors) **4 QH**
Honors equivalent of PHY 1111.

PHY 1721 Physics 1 **4 QH**
Honors equivalent of PHY 1221.

PHY 1722 Physics 2 **4 QH**
Honors equivalent of PHY 1222.

PHY 1723 Physics 3 **4 QH**
Honors equivalent of PHY 1223.

PHY 1724 Physics 4 **4 QH**
Honors equivalent of PHY 1224.

PHY 1885, PHY 1886, PHY 1887, PHY 1888 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

PHY 1888, 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Political Science

POL 1110 Introduction to Politics **4 QH**
Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (Core Category II)

POL 1111 Introduction to American Government **4 QH**
Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policy-making. (Core Category II)

POL 1112/IAF 1112 Introduction to International Relations **4 QH**
Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (Core Category II)

POL 1113/IAF 1113 Introduction to Foreign Governments **4 QH**
Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1114 The United States Constitution **4 QH**
Introduces the U.S. Constitution by exploring its theory, its origin, and the institutions by which it bestows and restrains power. Surveys the constitutional liberties guaranteed. Examines what this fundamental supreme United States law means today, two centuries after its ratification. Other topics include congressional areas of policy-making responsibility, presidential power, the role of the judiciary in the American system of government, and the reconciliation of majority rule with minority rights.

POL 1260 Public Policy Analysis **4 QH**
Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policy-making process. Introduces such concepts as problem definition, agenda development, policy formation, implementation, and program evaluation. Examines basic policy-analysis methods. (Core Category VI)

POL 1261 Public Administration **4 QH**
Provides a broad overview of the administrative aspects of public policies and programs. Topics include public management, organizations, budgeting, personnel administration, and program evaluation.

POL 1262 Bureaucracy and Government Organizations **4 QH**
Examines the general principles underlying the structures, processes, and operation of public organizations. Looks at the role of bureaucracies within the larger political system, as well as how public agencies develop and change over time.

POL 1266 Public Personnel Administration **4 QH**
Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining.

POL 1267 Politics of Budgeting and Taxation **4 QH**
Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public-policy impacts of the budget. Emphasizes budgeting techniques within this context.

POL 1301 Research Methods 1 **4 QH**
Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq. Prior completion of college mathematics requirement.*

POL 1302 Research Methods 2 **4 QH**
Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of a programming language to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public-policy analysis. *Prereq. POL 1301 and prior completion of college mathematics requirement.*

POL 1303 Political Behavior **4 QH**
Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics **4 QH**
Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe **4 QH**
Offers a comparative survey of the societies, economies, and political systems in the democracies of Western Europe. Examines governing structures and major political developments within the major European states, as well as major policy issues (e.g., nationalism, federalism, environmentalism) and issues of European integration within the European Union. (Core Category III)

POL 1308/AFR 1271 The Politics of Poverty **4 QH**
Explores how and why there is poverty, how it affects people's lives, and how it can be eliminated. Examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 International Political Economy **4 QH**
Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq. A course in either economics or international politics is recommended, but not required.* (Core Category V)

POL 1310 American Ideology **4 QH**
Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (Core Category V)

POL 1312 Politics and the Mass Media **4 QH**
Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organizations **4 QH**
Focuses on the development of roles played by international governmental organizations, examining their dual roles as collections of sovereign states and as political actors in their own right. Analyzes the structure and functions of such global organizations as the United Nations as well as regional organizations like the European Union and Organization of American States.

POL 1314 Interest Groups and Public Policy **4 QH**
Surveys the roles of organized interests in American public policy-making. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1316 Contemporary Revolutionary Politics **4 QH**
Examines revolution as a political option and revolutionary movements throughout the world today. Examples will be taken from Marxism-Leninism (e.g., Bolshevik Russia, China, Cuba), revolutionary Islam (e.g., Iran, Algeria), and the anti-Communist forces in the former Soviet Union and eastern Europe. Examines the perennial conflict between revolution as an ideal and regime consolidation as a necessity. (Core Category VI)

POL 1317 Law and Society **4 QH**
Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.

POL 1318 State and Local Government **4 QH**
Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. *Prereq. POL 1111.*

POL 1319 Government and Politics of Massachusetts **4 QH**
Emphasizes the political and administrative aspects of government in Massachusetts. Considers the structure and functions of state government as well as major policy problems confronted by public officials. Analyzes the relationship between state and local governments in Massachusetts.

POL 1320 Parties and Elections **4 QH**
Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policy-making, and national and state historical trends.

POL 1322 World Politics **4 QH**
Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case-study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States–Soviet and Arab-Israeli viewpoints.

POL 1324 Urban Politics **4 QH**
Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective.

POL 1327 Gender Politics **4 QH**
Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the

traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in "new politics." Also covers political action to promote women's issues and modern feminism. (Core Category VI)

POL 1329 American Social Welfare Policy **4 QH**
Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American sociopolitical system.

POL 1331 Science, Technology, and Public Policy **4 QH**
Considers the effects of science and technology on politics and policy-making in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to "solve" than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (Core Category VI)

POL 1332 Government and Politics of Japan **4 QH**
Focuses on the development of Japan's political system since World War II. Examines Japan's political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan's foreign policy; and business practices and organization. Raises issues concerning Japan's extraordinary economic success and the limitations of Japan as a model for other countries. (Core Category IV)

POL 1334 Environmental Policy and Politics **4 QH**
Examines the policy-making processes, historical and socioeconomic factors, political forces, governmental institutions, and global trends that shape environmental policy at national and subnational levels in the United States. Gives attention to a wide range of environmental policy areas, with comparisons made between the United States and other nations.

POL 1335 The American Presidency **4 QH**
Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.

POL 1336 American Constitutional Law **4 QH**
Employs excerpts of United States Supreme Court decisions and other reading materials to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq. POL 1111 and junior or senior standing.*

POL 1337 United States Foreign Policy **4 QH**
Examines formulation and conduct of foreign policy and the United States since World War II.

POL 1338 Religion and Politics **4 QH**
Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in Africa and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the Religious Right in America. (Core Category V)

POL 1339 Current Political Issues **4 QH**
Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.

POL 1340 Crisis and Change in Central/Eastern Europe **4 QH**
Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia, and examines political, economic, social, and international problems of post-Communist development. (Core Category IV)

POL 1342/AFR 1342 Government and Politics of Africa **4 QH**
Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. (Core Category VI)

POL 1343 Politics and Violence in Northern Ireland **4 QH**
Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and the peace process. Draws comparative parallels, including possible lessons for the United States. (Core Category IV)

POL 1345 Government and Politics in the Middle East **4 QH**
Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (Core Category VI)

POL 1346 Gender, Family, and Politics in the Middle East **4 QH**
Surveys the roles that gender and family play in political, economic, and social issues of the Middle East. Focuses on several political systems to provide a view of the diversity and similarity between various governments and societies. Topics include women in development; the connection between family and political power; women and Islam; legal status of women; and women in liberation movements. *Prereq. POL 1345 or INT 1150/HST 1490 or permission of instructor.* (Core Category IV)

POL 1347 Russian Politics After Communism **4 QH**
Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of interethnic strife. (Core Category IV)

POL 1348 Russian Foreign Policy **4 QH**
Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.

POL 1350 American Legislative Process **4 QH**
Explores the structures, dynamics, and styles inherent in public policy-making within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other participants; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.

POL 1351 Techniques and Practices of Public Management **4 QH**
Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.

POL 1353 Law and Personal Morality **4 QH**
Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.

POL 1355 Ethnic Conflict **4 QH**
Analyzes the causes and consequences of ethnic political violence in the contemporary world. Examines selected cases based on their importance and their usefulness for understanding ethnic conflict (such as Bosnia, Canada, Northern Ireland, and states of the former Soviet Union). Considers various policies for preventing and resolving ethnic political violence. (Core Category IV)

POL 1362 Civil Liberties **4 QH**
Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.

POL 1364 Business and Government Relations **4 QH**
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.

POL 1368 Government and Politics of Latin America **4 QH**
Examines the governmental systems, political parties, socio-economic problems, and foreign policies of Latin American states. Focuses on political change. (Core Category IV)

POL 1369 Political Violence **4 QH**
Analyzes political violence in its various contemporary forms (for example, war, revolution, genocide, political terrorism, and military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence. (Core Category VI)

POL 1371 Government and Politics of China **4 QH**
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully, including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (Core Category IV)

POL 1373 Pre-Modern Political Thought **4 QH**
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance. (Core Category V) *Prereq. Middler standing or above.*

POL 1374 Modern Political Thought **4 QH**
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (Core Category V) *Prereq. Middler standing or above.*

POL 1378 Contemporary Political Thought **4 QH**
Analyzes current ideals, ideologies, and political movements, including existentialism, neo-Marxism, black power, and women's liberation. Also studies the decline of ideology and behavioralism.

POL 1379 Marx and Marxism **4 QH**
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (Core Category V)

POL 1382 Intergovernmental Relations **4 QH**
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.

POL 1384 Arab-Israeli Conflict **4 QH**
Analyzes the effects of the Arab-Israeli confrontation on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (Core Category VI)

POL 1386 International Law **4 QH**
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq. POL 1112.*

POL 1388 Political Polling and Survey Research **4 QH**
Examines the entire survey research process, which is the most common approach to program evaluation, survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq. POL 1301.*

POL 1389 American National Security Policy **4 QH**
Traces the evolution of American national security policy in the post–World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1396 Latino Politics in the U.S. **4 QH**
Focuses on Latinos in the U.S. political system. Latinos share many characteristics with previous wave of immigrants, but geographic proximity to Latin America and the constant influx of other Latinos present significant differences. Explores issues of Latino identity: who Latinos are, conflicting loyalties to particular group versus pan-Latino solidarity, their status in American society, and Latino relations with other American ethnic groups. Discusses these issues to provide the necessary background to explore Latino involvement in local, state, federal, and international politics. (Core Category IV)

POL 1410 Seminar in American Government **4 QH**
Offers an in-depth study of selected topics in American government. *Prereq. Senior political science major and permission of instructor.*

POL 1411 Seminar in International Relations **4 QH**
Offers an in-depth study of selected topics in international relations. *Prereq. Senior political science major and permission of instructor.*

POL 1413 Senior Seminar in Political Science **4 QH**
Offers an in-depth study of selected topics in political science. *Prereq. Senior political science major.*

POL 1415 Seminar in Public Law and Social Issues **4 QH**
Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than merely personal or political, answers to contentious legal questions. *Prereq. Junior or senior standing.*

POL 1710 Introduction to Politics (Honors) **4 QH**
Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) **4 QH**
Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) **4 QH**
Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 **4 QH each**
Directed Study
Offers independent work on chosen topics under the direction of members of the department. *Prereq. Junior or senior standing and permission of instructor.*

POL 1803 Internship in Politics **4 QH**
With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors. Prereq. Junior or senior standing normally required.*

POL 1804 Vote Smart Practicum **4 QH**
Offers supervised hands-on experience with a nationally recognized nonpartisan voters' information resource center. Students are trained on the computer in the use of various databases, engage in assigned research tasks, and assist voters and journalists seeking information on candidates for federal and state office. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors.*

POL 1805 Internship in American Government and Politics **4 QH**
Students engage in an internship in the Federal government with department approval, under the supervision of a faculty member. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors. Prereq. Junior or senior standing usually required.*

POL 1815 Internship in State Government **6 QH**
Combines state government work experience with academic studies. Students work 15 hours per week in a state government office and attend classes every other week in which work experience and related readings are discussed. *This course fulfills the College of Arts and Sciences experiential education requirement for political science majors. Prereq. POL 1111 or POL 1318.*

Psychology

PSY 1111 Foundations of Psychology 1 **4 QH**
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 **4 QH**
Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq. PSY 1110 or PSY 1111.*

PSY 1210 Research in Psychology **4 QH**
Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq. PSY 1112 or PSY 1113.*

PSY 1211 Statistics in Behavioral Science 1 **4 QH**
Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq. MTH 1101 or MTH 1107, and PSY 1112, or permission of instructor.*

PSY 1212 Statistics in Behavioral Science 2 **4 QH**
Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq. PSY 1211.*

PSY 1215 Sexual Behavior **4 QH**
Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness **4 QH**
Introduces the varied scientific approaches to the study of consciousness and the diverse theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming, hypnosis, meditative states, pain perceptions, and anomalistic psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems. *Prereq. PSY 1112 or PSY 1113.*

PSY 1218 Psychology of Women **4 QH**
Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness **4 QH**
Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation **4 QH**
Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq. PSY 1112 or PSY 1113, or permission of instructor.*

PSY 1241 Developmental Psychology **4 QH**
Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq. PSY 1112 or PSY 1113.*

PSY 1242 Adult Development and Aging **4 QH**
Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq. PSY 1112 or PSY 1113.*

PSY 1243 Infant Development **4 QH**
Focuses on the fact that during the first two years of life, the basic physical, perceptual, cognitive, and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq. PSY 1241 or ED 1102.*

PSY 1244 Childhood Mental Illness and Mental Retardation **4 QH**
Focuses on mental illnesses that are first diagnosed in childhood such as autism, phobias, conduct disorders, and attention-deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping. Covers etiological factors in mental retardation (e.g., maternal disease, lead poisoning, chromosome abnormalities). Describes personality characteristics of individuals with mental retardation as well as the effects of institutionalization, mainstreaming, and psychological interventions. *Prereq. PSY 1112.*

PSY 1251 Food, Behavior, and Eating Disorders **4 QH**
Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language **4 QH**
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq. PSY 1112 or PSY 1113 or permission of instructor.*

PSY 1263 Nonverbal Communication **4 QH**
Examines the messages we send by posture, facial expression, voice quality, gestures, touch, gaze, and interpersonal distance. Examines origins and consequences of these behaviors as well as differences related to culture, personality, power, gender, and age. *Prereq. PSY 1112 or PSY 1113.*

PSY 1268 Psychology and Film **4 QH**
Uses selected films to investigate psychological subjects, including human development over the life cycle (particularly childhood and adolescence), family dynamics, sexuality, and psychopathology (trauma, anxiety and eating disorders, psychosis). *Prereq. PSY 1112 or PSY 1113.*

PSY 1271 Social Psychology **4 QH**
Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change and measurement; conformity; impression formation; and group processes (social facilitation, deindividuation, for example). *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1272 Personality 1 **4 QH**
Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq. PSY 1112 or PSY 1113.*

PSY 1273 Personality 2 **4 QH**
Continues PSY 1272. *Prereq. PSY 1272.*

PSY 1274 Psychology and the Law **4 QH**
Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1280/AFR 1280 Race and Social Identity **4 QH**
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American and white ethnic identity. Outlines the history of the concept of race in America. Studies ethnic identity as it has been conceptualized and measured by psychologists. Examines the psychology of intergroup relations and addresses strategies for reducing racism.

PSY 1351 Psychobiology **4 QH**
Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1362 Language Acquisition **4 QH**
Examines how language develops in children. *Prereq. PSY 1262, LIN 1118, or permission of instructor.*

PSY 1364 Cognition **4 QH**
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq. PSY 1112, PSY 1113, or permission of instructor.*

PSY 1365 Language and the Brain **4 QH**
Focuses on linguistic behavior from a neuropsychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from "slips of the tongue"; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq. PSY 1262 or permission of instructor.*

PSY 1366 Cognitive Development **4 QH**
Explores patterns of thought characteristics of infants and young children, how those patterns change with age, and different theoretical explanations for patterns of change. Seeks to convey the state of the art in cognitive developmental theory and research, and to provide students with critical-thinking skills needed to evaluate research in cognitive development. Supplements lectures with class exercises and demonstrations. Topics include development of object perception, memory, categorization, reasoning and problem solving, social cognition, and conceptual change. Discusses theoretically controversial issues such as the interaction of mind and environment in development, domain-general versus domain-specific processes, cognitive development across cultures, and the role of biological constraints in cognitive development. *Prereq. PSY 1241, PSY 1262, PSY 1364, or permission of instructor.*

PSY 1371 Industrial/Organizational Psychology **4 QH**
Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq. PSY 1211 and PSY 1271.*

PSY 1373 Abnormal Psychology 1 **4 QH**
Surveys the abnormal personality, including systems of diagnoses, defense mechanisms, and criteria of psychopathology. Examines the symptomatology, etiology, and dynamics of anxiety disorders (phobia, obsessions, compulsions, etc.), dissociative disorders (amnesia, multiple personality, etc.), and somatoform disorders. Examines case histories in detail. *Prereq. PSY 1112 or PSY 1113.*

PSY 1374 Abnormal Psychology 2 **4 QH**
Surveys psychological and somatic therapies. Examines the symptomatology, etiology, dynamics, and therapy of schizophrenia, paranoid disorders, mania, depression, and organic disorders. *Prereq. PSY 1373.*

PSY 1375 Clinical Case-Study Development **4 QH**
Students reflect upon the clinical case-study notes and personal journal entries made during the preceding clinical co-op experience. Students are expected to identify and research the psychological, neuropsychological, systemic, and behavioral aspects of disorders (e.g., mental retardation, eating disorders, schizophrenia) that they encountered. Evaluates proficiency in applying theoretical perspectives to research through written and oral reports. *This course fulfills the College of Arts and Sciences experiential education requirement for psychology majors.*

PSY 1381 Sensation **4 QH**
Provides an introduction to the study of our senses, with emphasis on vision, hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—eyes, ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq. PSY 1112 or PSY 1113; PSY 1351 is highly recommended or permission of instructor.*

PSY 1382 Perception **4 QH**
Offers a study of our awareness of the world around us, with an emphasis on visual and auditory perception. Covers perception of light, sound, space, form, motion, auditory scene analysis, and one or more of color, attention, music, and speech perception. Discusses biological reductionism, Gestalt theory, Gibson's direct perception theory, and Marr's computational theory. *Prereq. PSY 1112 or PSY 1113 or permission of instructor.*

PSY 1410 Systems and Theories of Psychology **4 QH**
Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq. Junior or senior status in psychology major or permission of instructor.*

PSY 1431 Behavior Therapies **4 QH**
Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq. PSY 1231 or permission of instructor.*

PSY 1442 Human Memory **4 QH**
Offers a detailed examination of how people learn and remember. Examines the different kinds of memory, short-term, episodic, and semantic, with emphasis on current theories of memory function and related experimental findings. *Prereq. PSY 1262 or PSY 1364.*

PSY 1451 Psychopharmacology **4 QH**
Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse. *Prereq. PSY 1351 or equivalent with permission of instructor.*

PSY 1471 Social/Personality Roundtable **4 QH**
Develops skills in conceptualization and discourse on current topics in social and personality psychology. Uses the combination of a speaker series paired with discussion, readings, and topical papers to promote critical thinking in psychology. *Prereq. PSY 1271 or PSY 1272.*

PSY 1499 Psychology of Reading **4 QH**
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension. *Prereq. PSY 1262 or PSY 1364.*

Directed Studies — Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) **4 QH**
Honors equivalent of PSY 1110. (Core Category II)

PSY 1713 Perspectives in Psychology 2 (Honors) **4 QH**
Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study **4 QH**
For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 **4 QH each**
Directed Study
Offers empirical research under the direction of the psychology department, usually on a laboratory or field-based research project under the supervision of a faculty member. Requires a research paper, oral presentation, or poster presentation of the student's work. Interested students should consult directly with the research faculty member, or with a departmental adviser for guidance, at least one quarter before the directed study is undertaken. *Prereq. Permission of instructor.*

PSY 1895, PSY 1896, PSY 1897, PSY 1898 **4 QH each**
Junior/Senior Honors Program
For details, contact the honors office.

PSY 1992, PSY 1993, PSY 1994 Independent Study **4 QH**
Offers a reading course for the student who wants guidance in the archival exploration and in-depth study of a topic of interest. Conducts study through a series of individual tutorials or discussions with a faculty member that typically involves an extensive, analytical review of the literature. Interested students should consult directly with the relevant faculty member, or with a department adviser for guidance in locating the most appropriate faculty person, at least one quarter before the study is undertaken. *Prereq. Permission of instructor.*

PSY 1996, PSY 1997, PSY 1998, PSY 1999 Psychology Adjunct **1 QH each**
A student, under the guidance of a faculty member, may work on any of the following projects with a minimum time commitment of three hours per week: Part 1 of the experiential education requirement; continue the academic exploration of a previous course subject; develop specialized skills or materials related to career goals. *Prereq. Permission of instructor.*

Laboratories

PSY 1511 Experimental Design in Psychology **4 QH**
Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq. PSY 1112 or PSY 1113 and PSY 1212.*

PSY 1530 Experiments in Learning and Motivation **4 QH**
Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles, primarily through field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq. PSY 1211 and PSY 1231.*

PSY 1531 Learning and Motivation Laboratory **4 QH**
Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq. PSY 1212 and PSY 1231.*

PSY 1551 Laboratory in Psychobiology **4 QH**
Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq. PSY 1351 or permission of instructor.*

PSY 1553 Animal Behavior Research **4 QH**
Offers students the opportunity to examine key concepts and principles by conducting field studies at a local zoological park or facility following a broad survey of the animal kingdom to identify similarities and differences in the behavioral processes by which individuals and species adapt to their environments. Addresses, through individual or group research projects, such issues as adaptive specializations in learning; the advantages of living in social organization; animal communication; mechanisms of reproduction; cooperation and aggression; ontogeny of behavioral characteristics; and the adaptive roles of male-female differences. Introduces students to the skills of animal-behavior research using a variety of field observation techniques that involve collecting and analyzing data and writing scientific reports on the projects. *Prereq. PSY 1112 or PSY 1113 and PSY 1211 or permission of instructor.*

PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1364 or PSY 1262.*

PSY 1571 Laboratory in Social Psychology **4 QH**
Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq. PSY 1212 and PSY 1271.*

PSY 1572 Personality Laboratory **4 QH**
Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq. PSY 1212 and PSY 1272.*

PSY 1575/AFR 1575 Community Psychology Laboratory **4 QH**
Students reflect upon real-world obstacles in conducting independent field research in communities in and around Northeastern during the quarter. Student reflections are used to guide research design, to evaluate theory, and to problem-solve social problems. Research topics may focus on battered women, HIV, student stress, perceptions of the media, church involvement in dealing with stress, or topics affecting large minority populations. Evaluates student performance through class discussions and written research reports. *Fulfills the College of Arts and Sciences experiential education requirement for psychology majors.*

PSY 1581 Sensation and Perception Laboratory **4 QH**
Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory function, color vision and aftereffects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq. PSY 1212 and PSY 1381 or PSY 1382.*

Seminars

PSY 1610 Psychology and Personal Values **4 QH**
Students identify and reflect upon ethical concerns (e.g., related to confidentiality, animal use, racism, designing and applying research) that they encountered in their prior co-op/research experiences. Considers historical, psychological, philosophical, sociological, and spiritual perspectives. Students use reflective conversation to guide their ethical thinking, research, and problem solving. Evaluates research projects through written and oral reports. *Fulfills the College of Arts and Sciences experiential education requirement for psychology majors. Prereq. Any laboratory course in psychology and research or co-op experience in psychology.*

PSY 1614 Seminar on Heredity and Society **4 QH**
Focuses on the origins of the intelligence-testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq. Permission of instructor.*

PSY 1632 Seminar in Behavior Modification **4 QH**
Discusses topics in behavior modification in a seminar format. *Prereq. PSY 1231, PSY 1531, or permission of instructor.*

PSY 1651 Seminar in Neuropsychology **4 QH**
Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq. PSY 1351 or permission of instructor.*

PSY 1661 Seminar in Psycholinguistics **4 QH**
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1662 Seminar in Cognition **4 QH**
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by quarter. *Prereq. PSY 1212 and PSY 1262 or PSY 1364.*

PSY 1671 Seminar in Social Psychology **4 QH**
Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq. PSY 1271 or permission of instructor.*

PSY 1672 Seminar in Clinical Psychology and Personality **4 QH**
Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq. PSY 1374 (may be taken concurrently).*

PSY 1681 Seminar in Sensation and Perception **4 QH**
Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and logical manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq. PSY 1351 and PSY 1381 or PSY 1382.*

PSY 1888, 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

PSY 1990 and PSY 1991 Internship in Psychology **4 QH each**
Offers supervised experiences in the application of psychology in instructional, clinical, or other applied settings. *Prereq. Junior or senior psychology major, minimum QPA of 3.0, and approval by department.*

Note: *PSY 1410, Systems and Theories of Psychology, also counts as a seminar.*

Sociology

SOC 1100 Introduction to Sociology **4 QH**
Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life **4 QH**
Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1103 American Society **4 QH**
Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq. SOC 1100 or equivalent.*

SOC 1104 Contemporary Japanese Culture and Society **4 QH**
Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (Core Category IV)

SOC 1105 Society and Culture in Russia and the Former Soviet Union **4 QH**
Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (Core Category IV)

SOC 1120 Sociology of Boston **4 QH**
Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.

SOC 1121 Doing Sociology **4 QH**
Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of knowledge and as a method of studying social life. Requires students to use a computer during the course. (Core Category II)

SOC 1125 Social Problems **4 QH**
Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.

SOC 1135 Social Psychology **4 QH**
Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.

SOC 1140 Sociology of Prejudice and Violence **4 QH**
Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1146 Environment and Society **4 QH**
Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (Core Category VI)

SOC 1147 Urban Social Problems **4 QH**
Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality **4 QH**
See INT 1150 for course description.

SOC 1155 Sociology of the Family **4 QH**
Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (Core Category V)

SOC 1156 Violence in the Family **4 QH**
Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Gender in a Changing Society **4 QH**
Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.

SOC 1168 The Social Movements of the 1960s **4 QH**
Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations **4 QH**
Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. *Prereq. SOC 1100 or equivalent.*

SOC 1175 Sociology of Work **4 QH**
Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (Core Category VI)

SOC 1176 Sociology of Business/Industry **4 QH**
Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World **4 QH**
Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working **4 QH**
Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1185 Deviant Behavior and Social Control **4 QH**
Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.

SOC 1190 Juvenile Delinquency **4 QH**
Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society **4 QH**
Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism **4 QH**
Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health-care system, in labeling and in rehabilitation.

SOC 1205 Law, Crime, and Social Justice **4 QH**
Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police **4 QH**
Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1240/HS 1240 Sociology of Human Service Organizations **4 QH**
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty **4 QH**
Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1255 Sport in Society **4 QH**
Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1276 Sociology of Popular Culture **4 QH**
Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1285 Environment Technology and Society **4 QH**
Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological "fix" be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (Core Category VI)

SOC 1300 Classical Social Thought **4 QH**
Traces the development of sociology from the history of social thought. *Prereq. Three sociology/anthropology courses.*

SOC 1301 Current Social Thought **4 QH**
Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq. Three sociology or anthropology courses.*

SOC 1302 Feminist Perspectives on Society **4 QH**
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers

and evaluates women's views of social life as well as recognizes the differences among women. (Core Category VI)

SOC 1310 Class, Power, and Social Change **4 QH**
Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (Core Category V) *Prereq. One sociology course and middler standing or permission of instructor.*

SOC 1320 Introduction to Statistical Analysis **4 QH**
Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq. SOC 1100 or permission of instructor.*

SOC 1321 Research Methods 1 **4 QH**
Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq. SOC 1100 and SOC 1320, or permission of instructor.*

SOC 1322 Research Methods 2 **4 QH**
Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq. SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.*

SOC 1324/HS 1260 Human Services Research and Evaluation **4 QH**
Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq. SOC 1320 or other statistics, SOC 1240, or permission of instructor.*

SOC 1347 Community Analysis **4 QH**
Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1350 Women in Jewish Culture **4 QH**
Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship of women to Judaism by trying to recover Jewish women's experiences in America since the turn of the century by looking at some key institutions—work, family, religion, the feminist movement, the media, literature, and film.

SOC 1470 Sociology of Religion **4 QH**
Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq. SOC 1100.*

SOC 1485 Computers and Society **4 QH**
Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (Core Category VI) *Prereq. Junior in computer science or middler with ability to program.*

SOC 1500 Applied Sociology: Practice and Theory **4 QH**
The academic component of the experiential education requirement for sociology majors; to be taken after students have completed the experiential component. Provides a seminar format in which students will reflect upon their approved experience (e.g., co-op, internship, community service, etc.) and integrate it into a research project. Students who have completed study abroad or a service-learning course in the department may not have to take this course. *Prereq. Sociology majors only.*

SOC 1501 Social Policy and Social Intervention **4 QH**
Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1601 Seminar in Current Emphases in Sociology **4 QH**
Reviews and discusses selected sociological topics. *Prereq. Junior or senior standing in sociology/anthropology or permission of instructor.*

SOC 1700 Introduction to Sociology (Honors) **4 QH**
Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors) **4 QH**
Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study **4 QH each**
Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq. Junior or senior standing in sociology or permission of instructor.*

SOC 1821, SOC 1822, SOC 1823, SOC 1824 **4 QH**
Junior/Senior Honors Project
For details, contact the honors office.

SOC 1888, 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

Theatre

THE 1100 Introduction to Theatre Arts **4 QH**
Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (Core Category II)

THE 1106 Theatre History 1—Beginnings to Renaissance **4 QH**
Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

THE 1107 Theatre History 2—Renaissance to Naturalism **4 QH**
Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)

THE 1111 American Musical Theatre **4 QH**
Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.

THE 1112 Dramatic Theory and Criticism **4 QH**
Examines the major theoretical statements about Western theatre from Greece to present day. Devotes a significant portion of the course to twentieth-century critical strategies. (Core Category V)

THE 1114 Theatre and Society **4 QH**
Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (Core Category III)

THE 1116 The American Theatre **4 QH**
Traces the historical development of theatre in America, as well as its role as a social institution, economic enterprise, and art form.

THE 1118 Black Theatre in America **4 QH**
Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem Renaissance to the present, with an emphasis on the period beginning with Baraka's Dutchman.

THE 1121 Contemporary Theatre **4 QH**
Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth-century American and European theatre.

THE 1127 The Comic Theatre **4 QH**
Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the comic director, and the comedic actor. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon, as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

THE 1140 Playwriting 1 **4 QH**
Offers students the opportunity to develop a series of dramatic dialogues that culminate in the writing of a one-act play. Uses a workshop format.

THE 1149 Script Analysis for the Stage **4 QH**
Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that enables an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq. Theatre major or minor.*

THE 1150 Introduction to Acting **4 QH**
Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom of expression.

THE 1155 Voice for the Theatre **4 QH**
Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

THE 1160 Movement 1 **4 QH**
Emphasizes using the body as an expressive instrument for realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq. Theatre major or permission of instructor.*

THE 1180 Concepts of Direction **4 QH**
Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq. THE 1150 and THE 1212.*

THE 1200 Stagecraft **4 QH**
Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq. THE 1206 or departmental permission.*

THE 1206 Technical Theatre 1 **4 QH**
The initial technical theatre course required of all majors, covering the basic skills necessary in scene construction, and stage lighting.

THE 1207 Technical Theatre 2 **4 QH**
Covers the basic steps in stage management, stage makeup, and costume construction. Required of all majors.

THE 1208 Technical Theatre 3 **4 QH**
Covers the basic skills needed for scenery, lighting, and costume design. Required for production concentration. *Prereq. THE 1206 and THE 1207.*

THE 1209 Theatrical Drafting **4 QH**
Exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction through work on supervised classroom projects. *Prereq. THE 1200.*

THE 1210 Scenic Design for the Stage **4 QH**
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, et cetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. *Prereq. Permission of instructor.*

THE 1212 Introduction to Theatrical Design **4 QH**
Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles **4 QH**
Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq. THE 1210.*

THE 1225 Scene Painting **4 QH**
Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq. THE 1200 or permission of instructor.*

THE 1226 Lighting Design for the Stage **4 QH**
Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq. THE 1209 or departmental permission.*

THE 1261 Costuming 1 **4 QH**
Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction **4 QH**
Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup **4 QH**
Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq. Permission of instructor.*

THE 1284 Theatre Management **4 QH**
Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre **4 QH**
Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2 **4 QH**
Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq. THE 1150 and permission of department chair.*

THE 1301 Acting 3 **4 QH**
Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq. THE 1300 and permission of instructor.*

THE 1302 Acting 4 **4 QH**
Deals with scene work from a spectrum of theatrical genres. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq. THE 1301 and permission of instructor.*

THE 1316 Acting for the Camera (Television) **4 QH**
Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq. THE 1150.*

THE 1325 Musical Theatre Technique **4 QH**
Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. *Prereq. THE 1150, THE 1300, and permission of instructor.*

THE 1370 Rehearsal and Performance **4 QH**
Requires students to research, prepare, and perform either a substantial acting role, a design assistantship, a crew head, a dramaturgy, or a stage-management position under the direction and guidance of faculty. Students are expected to keep a rehearsal log and will synthesize and evaluate the experience in a final paper. This course may be repeated for credit up to three times for theatre majors. *Fulfills the College of Arts and Sciences experiential education requirement for theatre majors. Prereq. Permission of instructor.*

THE 1400 Costuming 2 **4 QH**
Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. *Prereq. THE 1261 or permission of instructor.*

THE 1410 Technical Production **4 QH**
Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. *Prereq. All courses in production/design concentration and permission of instructor.*

THE 1420 Advanced Drafting and Construction **4 QH**
Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem-solving with regard to safety, dependability, and economy. Lab fee. *Prereq. THE 1209.*

THE 1430 Lighting Design 2 **4 QH**
Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. *Prereq. THE 1226.*

THE 1510 Twentieth-Century Theatre **4 QH**
Studies the history of the postnaturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.

THE 1511 Theatre Through the Lens of Modernism **4 QH**
Covers seminal playwrights of the late nineteenth and twentieth centuries whose works have had a major impact on both modern drama and theatrical methods of production. (Core Category V)

THE 1800, THE 1801, THE 1802, THE 1803 **1 QH each**
Practicum in Production
Offers lab practice in technical production; can be repeated for credit (maximum four credits). *Prereq. Departmental permission.*

THE 1804, THE 1805, THE 1806, THE 1807 Practicum in Production **1 QH each**
Offers lab practice in rehearsal and performance for production; can be repeated for credit (maximum of four credits). *Prereq. Departmental permission.*

THE 1810, THE 1811, THE 1812, THE 1813 **4 QH each**
Junior/Senior Honors Project
For details, contact the honors office.

THE 1820, THE 1821, THE 1822, THE 1823 **4 QH each**
Directed Study

THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849 **4 QH each**
Special Topics in Theatre Performance
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 **4 QH each**
Special Topics in Theatrical Design
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1888, THE 1889 Experiential Education Directed Study **4 QH**
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.

THE 1890, THE 1891, THE 1892, THE 1893 **4 QH each**
Special Topics in Theatre History/Dramatic Criticism
Offers opportunity for in-depth examination of a subject of particular significance to the field.

THE 1899 Advanced Television Production **4 QH**
Offers students the opportunity for in-depth examination of a subject of particular significance to theatre/television production.

Business Administration

Accounting

ACC 1111 Financial Accounting **4 QH**
Covers the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. *Prereq. Sophomore standing.*

ACC 1112 Managerial Accounting **4 QH**
Introduces students to managerial accounting concepts and analysis reports and decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of cash flows; cost management and behavior; cost-volume-profit analysis; ABC accounting; and relevant costs for decisions. *Prereq. ACC 1111 and sophomore standing.*

ACC 1331 Intermediate Accounting 1 **4 QH**
Const tutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq. ACC 1111 or equivalent and middler standing.*

ACC 1332 Intermediate Accounting 2 **4 QH**
Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Specific topics include fixed asset and intangible asset accounting, current and long-term liabilities, contingencies, pensions and other postemployment benefits, and leases. *Prereq. ACC 1331 and middler standing.*

ACC 1339 Cost Accounting **4 QH**
Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq. ACC 1112 and middler standing.*

ACC 1343 Intermediate Accounting 3 **4 QH**
Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq. ACC 1332 or permission of instructor.*

ACC 1345 Accounting Systems **4 QH**
Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach to consider the appropriate use of computer technology in designing new systems. Covers system analysis and design concepts, files and database design, and how to control specific accounting applications. Provides hands-on experience in operating a computerized accounting system. *Prereq. ACC 1331, introductory computer course, or permission of instructor, and middler standing.*

ACC 1347 Auditing **4 QH**
Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq. ACC 1332 or ACC 1343.*

ACC 1351 Federal Income Taxes 1 **4 QH**
Emphasizes basic understanding of the federal income tax structure relating to individuals. Requires completion of tax return problems and research cases directed at addressing various tax situations. Through these projects, the different sources of tax authority are introduced. *Prereq. ACC 1332 or permission of instructor.*

ACC 1512 Federal Income Taxes 2 **4 QH**
Continues the examination of the federal income tax system. Emphasizes the tax implications of property transactions and choice of business entity. Transactions between owners and business entities are also examined. A major emphasis is given to tax planning considerations, especially corporate tax consequences. *Prereq. ACC 1351.*

ACC 1521 Advanced Accounting **4 QH**
Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships; business combinations and consolidated financial statements; bankruptcy, liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and accounting for governmental units. *Prereq. ACC 1343 or permission of instructor.*

ACC 1550 Forensic Accounting **4 QH**
Covers the nature, function, and environment of forensic accounting through class discussion, related exercises, casework, and guest speakers. Introduces students to basic accounting principles and attempts at fraudulent financial reporting. Topics include: funds flow within financial institutions; fraud schemes to "cook" the books; red flags related to fraud; concealed income analysis; and the accumulation/presentation of evidence of fraud. *Prereq. ACC 1111.*

ACC 1591 Independent Study **1 QH**
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study **2 QH**
Same as ACC 1591.

ACC 1593 Independent Study **3 QH**
Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study **4 QH each**
Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors) **4 QH**
See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors) **4 QH**
See course description for ACC 1112.

ACC 1810 Big-Picture Accounting (Honors) **4 QH**
Helps students make managerial decisions, such as pricing, product design, or make-or-buy decisions, using accounting information—especially data on product and service costs—in combination with input from other corporate functions. Offers students the opportunity to combine knowledge gained about costs with knowledge of operations, finance, marketing, the overall organization, and the competitive context to make sound business decisions. Examines a variety of firms facing the challenge of managing in a global economy in the Information Age. Discusses how to implement, in an international and multicultural context, the action plans generated from analyzing complex information. Tests action plans for consistency with critical goals such as quality, customer focus, and continuous improvement. *Prereq. Honors participation or instructor's permission.*

ACC 1891 Honors Thesis in Progress **0 QH**

ACC 1892 Honors Thesis **8 QH**

ACC 1893 Honors Thesis in Progress **0 QH**

ACC 1894 Honors Thesis **12 QH**

Entrepreneurship

ENT 1330 Entrepreneurship **4 QH**
Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business **4 QH**
Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures **4 QH**
Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute **8 QH**
Provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Sponsored by the United States Small Business Administration (SBA). Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq. Junior standing or permission of instructor.*

ENT 1591 Independent Study **1 QH**
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study **2 QH**
Same as ENT 1591.

ENT 1593 Independent Study **3 QH**
Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study **4 QH each**
Same as ENT 1591.

ENT 1598 Independent Study **8 QH**
Same as ENT 1591.

ENT 1891 Honors Thesis in Progress **0 QH**

ENT 1892 Honors Thesis **8 QH**

ENT 1893 Honors Thesis in Progress **0 QH**

ENT 1894 Honors Thesis **12 QH**

Finance and Insurance

FIN 1333 Financial Institutions and Markets **4 QH**
Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq. ACC 1112 and middler standing.*

FIN 1335 Managerial Finance **4 QH**
Provides students the opportunity to gain knowledge of the advanced tools and concepts used in the financial management of the firm. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq. FIN 1439.*

FIN 1346 Investment Management **4 QH**
Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq. FIN 1439.*

FIN 1438 Principles of Finance 1 **4 QH**
Familiarizes students with the concepts, tools, practices, and procedures in financial management. Covers capital budgeting, valuation, and time value of money; financial planning, analysis, and risk management. Uses problems, case discussions, spreadsheet analysis, and other computer-based teaching tools to enhance student understanding of financial concepts. *Prereq. ACC 1111, MSC 1200, and middler standing.*

FIN 1439 Principles of Finance 2 **4 QH**
Analyzes financial statements of the firm, with emphasis on long-term planning and financing, financial policy, and short-term planning. International corporate finance and financial ethics are covered in both FIN 1438 and FIN 1439. Strong emphasis is placed on the link of finance to other functional areas such as strategy, marketing, operations, and accounting. *Prereq. ACC 1112, MSC 1201, and FIN 1438.*

FIN 1503 Taxes and Financial Decisions **4QH**
Uses the case method to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies, and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq. FIN 1439 and middler standing.*

FIN 1520 Financial Risk Management **4 QH**
Explores the concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage risk. Topics include mechanics of these markets, techniques that can hedge risk exposure, tracing methods, and current developments in the field. *Prereq. FIN 1346.*

FIN 1526 Securities Markets **4 QH**
Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq. FIN 1439.*

FIN 1530 Working Capital Management **4 QH**
Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. *Prereq. FIN 1439.*

FIN 1531 Valuation and Value Creation **4 QH**
Explores recent developments in financial management and financial analysis through the use of modern finance theory, to make capital allocation decisions that lead to long-run value maximization for the corporation. Focuses on applications and financial model-building. Examines risk analysis by building spreadsheet models for valuation and risk-analysis applications. Utilizes valuation analysis models to merge financial, corporate, and business strategies to measure and manage corporate value. Develops an understanding of the mechanics of the valuation process, along with an understanding of the drivers of value and development of strategies for value creation. Topics covered are relevant to value consultants, corporate managers, and securities analysts.

FIN 1535 Issues in Corporate Governance **4 QH**
Examines the nature of conflicts over control of the corporation. Applies modern finance theory and practice to the issues raised and draws on seminal works in the finance and economics literature that influence the current debates in this area. Discusses legal and ethical considerations that are especially important in corporate-control issues. Uses cases involving well-known takeovers of the 1980s as well as current hostile takeover battles to illustrate the theories discussed. *Prereq. FIN 1439.*

FIN 1538 Financial Ethics **4 QH**
Considers the ethical issues and problems that are involved in the financial decision. Helps students understand ethical dilemmas in the world of finance and their influence on business decisions and behavior. Involves preparation and discussion of case studies and making class presentations; requires logic, intellect, and develops ethical values. *Prereq. FIN 1438.*

FIN 1540 Management of Financial Institutions **4 QH**
Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq. FIN 1333 or FIN 1439.*

FIN 1543 Modern Portfolio Management **4 QH**
Analyzes the process of constructing and managing an asset portfolio to meet stated objectives. Exposes students to theoretical models of portfolio choice and statistical analysis of appropriate data. Offers students the opportunity to design a portfolio that combines theory with the practice of portfolio management in an international context. Covers performance evaluation. *Prereq. FIN 1346.*

FIN 1544 Bank Management **4 QH**
Covers the structure, regulation, and financial management of commercial banks in a globally competitive environment. Topics include measuring bank performance, managing interest rate risk, the analysis of foreign exchange activities, managing liabilities and capital risk, determining the cost of funds, managing cash assets and planning and controlling liquidity, bank investment and non–interest income policies, the extension of credit and the analysis of credit worthiness, and merger and acquisition valuation. These are studied through lectures, readings, case analyses, and class discussions.

FIN 1545 Investment Banking **4 QH**
Focuses on the managerial functions of investment banking firms. Examines the role of investment bankers in linking capital requirers (corporations, governments, and institutions). Discusses market structure changes.

FIN 1549 Principles of Real Estate **4 QH**
Surveys the field of real estate, including principles of real estate law, transactions, brokerage, management, development, valuation, taxation, finance, and investment. Analyzes real estate markets with linkages to legal property rights, urban economics and finance. Familiarizes students with concepts and practices in real estate markets to prepare for future studies in real estate. *Prereq. FIN 1438.*

FIN 1550 Real Estate Finance and Investment **4 QH**
Provides a framework of real estate finance and investment, on both theory and practice. Examines all aspects of real estate financing including the primary and secondary mortgage markets, real estate financial institutions, regulations and mortgage-backed securities. Analyzes the return, risk and various strategies in real estate investments with financial methods and techniques. Uses case discussions, spreadsheet analysis, and investment projects to make learning effective. *Prereq. FIN 1439 and FIN 1549.*

FIN 1562 Employee Benefits Management **4 QH**
Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq. FIN 1439.*

FIN 1566 Risk Management and Insurance **4 QH**
Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq. FIN 1439.*

FIN 1580 Personal Financial Management **4 QH**
Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq. FIN 1438.*

FIN 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study **2 QH**
Same as FIN 1591.

FIN 1593 Independent Study **3 QH**
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study **4 QH each**
Same as FIN 1591.

FIN 1739 Principles of Finance 2 (Honors) **4 QH**
Analyzes financial statements of the firm with emphasis on long-term planning and financing, financial policy, and short-term planning. Covers both international corporate finance and ethics in finance. Places strong emphasis on the link of finance to other functional areas such as strategy, marketing, operations, and accounting. *Prereq. ACC 1112, FIN 1438, MSC 1201.*

FIN 1759 International Financial Markets **4 QH**
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq. FIN 1439.*

FIN 1760 International Financial Management **4 QH**
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq. FIN 1759.*

FIN 1770 Entrepreneurial Finance **4 QH**
Provides a summary overview of entrepreneurial finance with a specific focus on small businesses, corporate ventures, and intrapreneurship. Applies knowledge of corporate finance in the context of starting, acquiring, managing, and divesting a business or a business unit within a corporation. Covers such topics as analyzing the financial needs of new ventures, sources of financing, managing decline, valuation, and exit strategies. Provides students with the opportunity to work with College of Engineering students in a special project funded by the General Electric Foundation.

FIN 1804 Issues in Corporate Control (Honors) **4 QH**
Examines the nature of conflicts over control of the corporation, which often erupt as proxy fights or hostile takeover attempts. Such conflicts cause scholars, managers, shareholders, and legislators to reexamine fundamental beliefs regarding the nature of the publicly held corporation. While applying modern finance theory and practice to understand the issues raised, the course also draws on seminal works in finance and economics literature that influence current debates in this area. Addresses the legal and ethical considerations especially important in corporate control issues. Uses cases involving well-known takeovers of the 1980s as well as current hostile takeover battles to illustrate the theories discussed. *Prereq. Honors participation or instructor's permission.*

FIN 1818 Turnaround Management (Honors) **4 QH**
Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq. Honors participation or permission of instructor.*

FIN 1820 Fixed-Income Securities and Risk (Honors) **4 QH**
Exposes students to theory, applications, and evidence concerning highly sensitive interest rate products. Teaches recent developments in pension fund management, asset/liability management, duration matching, "gap" management, concurrent interest rate and exchange rate management, and other important issues confronting domestic and international financial and corporate management. Students can learn how to customize a risk management program. *Prereq. FIN 1346.*

FIN 1891 Honors Thesis in Progress **0 QH**

FIN 1892 Honors Thesis **8 QH**

FIN 1893 Honors Thesis in Progress **0 QH**

FIN 1894 Honors Thesis **12 QH**

Human Resources Management

HRM 1332 Introduction to Human Resources Management **4 QH**
Helps students develop understanding of contemporary issues in human resources management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1345 Managing Employee Relations **4 QH**
Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration **4 QH**
Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1349 Selection and Assessment of Employees **4 QH**
Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. HRM 1432 or HRM 1433 and middler standing.*

HRM 1350 Skills of Leading and Managing **4 QH**
Identifies the basic behavioral skills of the manager and leader role. Engages students in a number of activities that will provide the opportunity to develop those skills, including motivating, supervising, communicating, resolving conflict, leading, coaching, and negotiating. Emphasizes self-assessment and experiential exercises aimed at skill development. *Prereq. HRM 1432 or HRM 1433 and senior standing.*

HRM 1432 Organizational Behavior **4 QH**
Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing. (Not open to College of Business Administration students.)*

HRM 1433 Organizational Behavior and Design **8 QH**
Helps managers and potential managers develop people skills. Focuses on the individual, interpersonal, group, and organizational level. Uses case studies, simulation, role playing, and theory to help students learn concepts and techniques of managing with and through people. Develops skills through practice. *Prereq. Middler standing.*

HRM 1519 Leadership **4 QH**
Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1587 Training and Development **4 QH**
Explores contemporary methods for developing and delivering training programs that enhance performance at both an individual and organizational level. Emphasizes practical application in the areas of need analysis, curriculum design, learning objectives, program development, materials preparation, training interventions, course evaluation, and facilitation skills. Gives students the opportunity to develop, conduct, and evaluate training sessions. *Prereq. HRM 1433.*

HRM 1591 Independent Study **1 QH**
Allows a student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study **2 QH**
Same as HRM 1591.

HRM 1593 Independent Study **3 QH**
Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 Independent Study **4 QH each**
Same as HRM 1591.

HRM 1760 International Labor Relations Systems **4 QH**
Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings **4 QH**
Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1812 The Management of Innovation (Honors) **4 QH**
Innovation is the process of turning ideas into useful outputs. Explores what the manager can do to foster innovation as well as control and direct it to best accomplish the company's goals. Discusses the process of innovation, the role of the manager, and the selection of organization designs and systems as key components of innovation. *Prereq. Honors participation or instructor's permission.*

HRM 1826 Cross-Cultural Management Through Literature **4 QH**
Focuses on helping students develop skills in cross-cultural management using recent articles from business journals as well as short stories from authors around the world. Discusses these stories using the management articles as an analytical framework. Topics include culture shock, repatriation, the meaning of work and personal values, power and authority, status and hierarchy, ethics, and change. *Prereq. Honors participation or instructor's permission.*

HRM 1891 Honors Thesis in Progress **0 QH**

HRM 1892 Honors Thesis **8 QH**

HRM 1893 Honors Thesis in Progress **0 QH**

HRM 1894 Honors Thesis **12 QH**

International Business Administration

INB 1338 Introduction to International Business **4 QH**
Focuses on the broad cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; and the development of management strategies for international businesses. *Prereq. Middler standing.*

INB 1352 Seminar in International Business **4 QH**
Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing.*

INB 1731 Cultural Aspects of International Business **4 QH**
Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States–based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management **4 QH**
Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

MGT 1115 Introduction to Business **4 QH**
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.

MGT 1345 Legal Aspects of Business **4 QH**
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.

MGT 1350 Advanced Strategic Management **4 QH**
Emphasizes the systems designed by managers to facilitate organizational change and effective strategy implementation. Develops a framework for understanding and managing the complex interrelationships that exist among strategy, structure, culture, control systems, and management style, and their impact on the organization's performance, through readings and case discussions. Includes exploration of current strategic management issues, such as global expansion, corporate renewal, quality assurance, innovation and technology, strategic alliances, project management, and integrating functional perspectives, through discussion of current and classic strategic management writings. *Prereq. MGT 1450 and senior standing.*

MGT 1446 Managing Legal, Ethical, and Social Issues **4 QH**
Focuses on the legal, social, ethical, and economic influences as well as domestic and international cultural factors affecting business. Treats various ways the manager can respond to these influences. Topics include the several possible models of the business and society relationship; the foundations of personal and managerial ethics; the business, government, and society interrelationships; ways the manager can address various stakeholder interests; and strategic and corporate public-policy consequences of management's responses to specific social issues. *Prereq. Junior standing.*

MGT 1450 Strategic Management **4 QH**
Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq. Senior standing.*

MGT 1575 Negotiations **4 QH**
Focuses attention on the strategies and techniques employed in the negotiations process. Includes familiarization with related literature, student role-playing, and interaction with professionals involved in private and public sector negotiations.

MGT 1580 Intercultural Negotiation and Conflict **4 QH**
Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.

MGT 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MGT 1592 Independent Study **2 QH**
Same as MGT 1591.

MGT 1593 Independent Study **3 QH**
Same as MGT 1591.

MGT 1594, MGT 1595, MGT 1596, MGT 1597 Independent Study **4 QH each**
Same as MGT 1591.

MGT 1803 Management and the Internet: Competition, Strategy, and Policy **4 QH**
Discusses the dynamics of cyberspace and what it takes to function effectively in it as a manager and citizen. Focuses on the explosive global growth of the Internet and cyberspace as well as how the new environment of cyberspace is transforming corporate strategies in the global economy and in individual and group relationships. Provides the opportunity to develop expertise in electronic conferencing and techniques for Internet-based information discovery, evaluation, and analysis by holding part of the seminar on-line. Explores a wide range of state-of-the-art issues, including digital literacy, global digital commerce, censorship, privacy, Internet policy, and the impact of cyberspace on personal identity. Includes the opportunity to develop a significant research project on a cyberspace topic of interest. *Prereq. Honors participation or instructor's permission.*

MGT 1820 Independent Study (Honors) **4 QH**
Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.

MGT 1842 World of Consulting (Honors) **4 QH**
Focuses on providing an overview of the consulting world. Topics include the structure of the consulting industry, covering the various types of consulting organizations from large to small, with an emphasis on those specializing in strategy consulting. Analyzes such corporations as Bain & Co., McKinsey, AD Little, and Andersen Consulting, as well as the other "big six" firms, which have in recent years become major players on the world consulting scene. Offers students the opportunity to gain an appreciation of the importance of these organizations in the global business arena, describes their various modes of operation, and introduces career opportunities available in the field of consulting. *Prereq. Honors participation or permission of instructor.*

MGT 1891 Honors Thesis in Progress **0 QH**

MGT 1892 Honors Thesis **8 QH**

MGT 1893 Honors Thesis in Progress **0 QH**

MGT 1894 Honors Thesis **12 QH**

Management Science

MSC 1200 Business Statistics 1 **4 QH**
Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. *Prereq. MTH 1114.*

MSC 1201 Business Statistics 2 **4 QH**
Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time-series analysis. *Prereq. MSC 1200.*

MSC 1226 Computer-Based Information Systems **4 QH**
Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to apply technology and problem-solving skills.

MSC 1330 Data Management **4 QH**
Builds on the functional skills learned in MSC 1226. Exposes students to the essentials of data management. Topics include database design, selection and use of a database software package, database administration, security, privacy, and data recovery. *Prereq. MSC 1226.*

MSC 1332 Decision Support Systems for Business **4 QH**
Provides students with an understanding of the impact of computer-based tools on business decision-making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision-support software such as graphics and expert systems. Gives students the opportunity to build a decision-support system and create the supporting system documentation and user manual in a course project. *Prereq. MSC 1226.*

MSC 1335 Telecommunications and Networks **4 QH**
Reviews business telecommunications. Focuses on the design, use, and management of networks. Topics include telecommunications technology, network structures, and current telecommunication applications in business such as electronic mail, teleconferencing, and distributed applications. *Prereq. MSC 1226.*

MSC 1336 Business Programming **4 QH**
Provides students with experience in structured reasoning and programming. Gives students the opportunity to gain an appreciation for design, coding, debugging, and executing program modules. Emphasizes the design methodologies required to create such modules. *Prereq. MSC 1226.*

MSC 1341 Information Resource Management **4 QH**
Examines the major organizational and managerial issues associated with managing the information resource, focusing on three thematic components. Gives students the opportunity to assume a strategic viewpoint and consider using information to achieve competitive advantage, create new products or services, or to reengineer the business; learn about using information technology to support the functional areas of the business such as finance, manufacturing, or human resources; consider issues related to managing information technology such as outsourcing IS applications, project management, and investing in new technology. *Prereq. MSC 1226 and junior standing.*

MSC 1342 Business Systems Integration **4 QH**
Explores strategies for the technical and organizational integration of information systems through a project requiring students to form companies, analyze their data needs, design and build a set of information systems, and recommend a strategy for data architecture integration. This is the capstone course for the MIS concentration. *Prereq. MSC 1226, MSC 1330, MSC 1332, MSC 1335, MSC 1341. Suggested MSC 1336.*

MSC 1441 Operations Management **4 QH**
Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications.

MSC 1520 Mass Customization **4 QH**
Mass customization refers to meeting individual customers' needs by using mass production methods. Focuses on important issues such as characterization and typology of mass customization systems, individualized product/service development, market analysis and one-to-one marketing, electronic commerce, virtual shopping, technology enablers, networking, virtual factories, enterprise architecture for mass customization, manufacturing/service costing, and logistics. Requires student teams to work on term projects to study firms involved in mass customized production/service. *Prereq. Senior standing.*

MSC 1566 Quality Management **4 QH**
Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of quality experts such as Deming, Juran, and Ishikawa. *Prereq. MSC 1201 and MSC 1441.*

MSC 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study **2 QH**
Same as MSC 1591.

MSC 1593 Independent Study **3 QH**
Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study **4 QH each**
Same as HRM 1591.

MSC 1701 Business Statistics 2 (Honors) **4 QH**
See course description for MSC 1201.

MSC 1826 Business Forecasting (Honors) **4 QH**
Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that involve forecasting. *Prereq. MSC 1201.*

MSC 1891 Honors Thesis in Progress **0 QH**

MSC 1892 Honors Thesis **8 QH**

MSC 1893 Honors Thesis in Progress **0 QH**

MSC 1894 Honors Thesis **12 QH**

Marketing

MKT 1331 Marketing Management **4 QH**
Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 1435 and middler standing.*

MKT 1341 Marketing Research **4 QH**
Focuses on the survey research process and the analysis of data using SPSS. Covers topics such as problem definition, research design, sampling, questionnaire design, data collection, and data analysis. Students expected to work on group projects. Requires no previous computer experience. *Prereq. MKT 1331 and MSC 1201.*

MKT 1351 Competitive Strategy **4 QH**
A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq. MKT 1331 and senior standing.*

MKT 1435 Introduction to Marketing **4 QH**
Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Sophomore standing.*

MKT 1501 Introduction to Retailing **4 QH**
Explores the dynamics of retailing and the range of firms that make up the retailing industry. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing, and retailing's role in the economy. *Prereq. MKT 1435 and middler standing.*

MKT 1503 Retail Merchandising and Control **4 QH**
Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq. MKT 1435 or permission of instructor.*

MKT 1515 Marketing in the Service Sector **4 QH**
Provides a basic treatment of methods and techniques for marketing in the service sector, which includes sports, recreation, public service, banking, insurance, and hotels. Analyzes a number of descriptive studies covering the application of marketing principles in key service areas as well as the principles themselves. *Prereq. MKT 1435.*

MKT 1518 Marketing and Technology **4 QH**
Explores the impact of the Internet, the World Wide Web, and emerging technological innovations such as wireless communication and digital media on the marketing of goods and services. Examines consumer response to these innovations and factors that lead to the adoption of these new technologies. Offers students the opportunity to study how electronic commerce is changing the way firms interact with the market and how firms are taking advantage of these new technologies to improve their marketing strategies. *Prereq. MKT 1435 or MKT 1735 and junior or senior standing.*

MKT 1523 Advertising Management **4 QH**
Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq. MKT 1331 and middler standing.*

MKT 1531 Sales Management **4 QH**
Provides training in effective selling skills and how to manage accounts. Discusses how customers buy products and services and how this relates to a company's sales process: prospecting accounts, making sales presentations, handling customer objections, closing sales, and post-sale servicing of accounts. Also covers current approaches such as relationship and partnership selling. *Prereq. MKT 1331 and middler standing.*

MKT 1536 Brand Management **4 QH**
Provides a comprehensive understanding of the role and responsibilities of a brand/product manager. Provides students with a practical understanding of the problems and challenges faced by brand or product managers in both consumer and industrial settings. Fosters proactive and creative marketing and promotional thinking. *Prereq. MKT 1435.*

MKT 1540 Marketing Channels **4 QH**
Examines the strategic decisions needed to develop channels of distribution (manufacturers, wholesalers, and retailers) whose purpose is to deliver products and services from producer to the end consumer. Places special emphasis on channel structure, channel design, and channel management, including the methods of negotiation, cooperation, and coordination, that channel partners use to operate efficiently and effectively. *Prereq. MKT 1435.*

MKT 1542 Business-to-Business Marketing **4 QH**
Examines corporate buyers and how they differ from household buyers/consumers. Studies company-to-company marketing and how it differs from consumer products marketing. Covers product and pricing elements as well as the role of industrial distributors and sales organizations. *Prereq. MKT 1331 and middler standing.*

MKT 1545 New Product Development **4 QH**
Focuses on the challenges and decisions managers face in creating, developing, launching, and managing new products and services. Special emphasis is given to the stages of the new product development process, the information needs in each stage, and approaches for gathering needed information. *Prereq. MKT 1331 and middler standing.*

MKT 1553 Foundations of Consumer Behavior **4 QH**
Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq. MKT 1331 and middler standing.*

MKT 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal

requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MKT 1592 Independent Study **2 QH**
Same as MKT 1591.

MKT 1593 Independent Study **3 QH**
Same as MKT 1591.

MKT 1594, MKT 1595, MKT 1596, MKT 1597 Independent Study **4 QH each**
Same as HRM 1591.

MKT 1735 Introduction to Marketing (Honors) **4 QH**
Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through discussions, lectures, readings, and group projects. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing and honors participation.*

MKT 1760 International Marketing **4 QH**
Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq. MKT 1331 and middler standing.*

MKT 1891 Honors Thesis in Progress **0 QH**

MKT 1892 Honors Thesis **8 QH**

MKT 1893 Honors Thesis in Progress **0 QH**

MKT 1894 Honors Thesis **12 QH**

Logistics and Transportation

TRN 1333 The Transportation Industries **4 QH**
Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.

TRN 1335 Current Issues in Supply Chain Management **4 QH**
Identifies important contemporary issues and problems in supply chain management and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.

TRN 1344 Supply Chain Management **4 QH**
Analyzes the role and activities of those involved in corporate supply chain management decision-making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, purchasing, and location decisions in the design and operation of supply-and-distribution systems.

TRN 1352 Advanced Problems in Supply Chain Management **4 QH**
Identifies and examines important issues that are of strategic importance to top-level professionals involved in supply chain management. Emphasizes the decision-making processes employed by those executives in the context of corporate strategic management.

TRN 1353 Seminar in Supply Chain Management **4 QH**
Focuses on a limited number of advanced supply chain management topics. The course has a seminar format and is primarily based on individual research efforts. Research findings are discussed with the class and shared through presentations.

TRN 1514 Carrier Management **4 QH**
Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and market development.

TRN 1591 Independent Study **1 QH**
Allows the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

TRN 1592 Independent Study **2 QH**
Same as TRN 1591.

TRN 1593 Independent Study **3 QH**
Same as TRN 1591.

TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study **4 QH each**
Same as TRN 1591.

TRN 1760 Global Logistics **4 QH**
Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.

TRN 1891 Honors Thesis in Progress **0 QH**

TRN 1892 Honors Thesis **8 QH**

TRN 1893 Honors Thesis in Progress **0 QH**

TRN 1894 Honors Thesis **12 QH**

Computer Science

COM 1100 Fundamentals of Computer Science **4 QH**
Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses character strings and 1-dimensional arrays. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components. *Prereq. An interest in programming computers.*

COM 1101 Algorithms and Data Structures 1 **4 QH**
Introduces algorithms, data structures, abstraction, and encapsulation. Examines arrays, stacks, classes, and templates. Discusses the creation of a data structure in layers using composition of simpler components. Uses the concept of class and template to encapsulate the functions and operations on a data structure. Studies specific classes for arrays, stacks, queues, complex arithmetic, polynomials, and function objects. Introduces dynamic-memory allocation for arrays and simple linked lists. Examines sorting and searching techniques and introduces recursion. *Prereq. COM 1100 or equivalent.*

COM 1102 Functional Programming and Its Applications **4 QH**
Introduces the fundamental concepts and applications of functional programming based on procedural and data abstraction. Discusses the relation between functional programming and symbolic processing as implemented in LISP-like languages. Covers simple applications selected from artificial intelligence, data-driven design, and programming language design and implementation. *Prereq. COM 1101.*

COM 1105 Computer Science and Its Applications **4 QH**
Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem-solving process. Discusses basic principles and provides hands-on experience with a word processor, a spreadsheet package, a database management system, and a presentation manager. *Not open to computer science or business administration majors.*

COM 1121 Computer Science Overview 1 **1 QH**
Introduces ideas and skills that are necessary for success in the computer science field. Examines the relation between personal goals and professional standards. Studies work habits, time management, organizational skills, interpersonal skills, and commitment. Raises issues of ethics and responsibility. Discusses thinking skills that are needed in computer science and introduces problem-solving exercises designed to develop these skills. Introduces readings from the software literature to illustrate the variety of skills needed in industry. *Prereq. Computer science majors only.*

COM 1122 Computer Science Overview 2 **1 QH**
Introduces the UNIX operating system, the Internet, and other important systems. Discusses their basic concepts and history. Introduces ethical issues such as privacy, security, reliability, and intellectual property. *Prereq. Computer science majors only.*

COM 1130 Computer Organization and Design **4 QH**
Discusses how a computer system works and why it performs as it does. Topics include assembly language (programs, call/return, stack frames), arithmetic (representations and algorithms), digital design (implementation of an RISC subset), and organization (memory hierarchy). *Prereq. COM 1101 or permission of instructor.*

COM 1150 Presentation of Information **4 QH**
Discusses the presentation of information as text, hypertext, outlines, numbers, tables, graphics, diagrams, maps, and annotated images. Emphasizes the relation between the discovery of meaning in raw information and the effective presentation of that information. Describes the principles and theories that guide the selection of visual means to present information. Introduces basic concepts of mathematics and statistics so that the visual and numerical methods for studying information may be compared. Utilizes assorted software tools to create effective presentations and also discusses the strengths and limitations of current computer technology. *Prereq. COM 1105 or equivalent. Computer Science majors may take for general elective credit only.*

COM 1160 Programming Using Visual Tools **4 QH**
Provides an introduction to programming using a high-level programming language. Introduces students to the basic concepts of computation (objects, data, decisions, loops, functions) using a high-level visual language that provides support for the rapid development of a graphical user interface. Emphasizes the ease of development using software toolkits. Develops programming skills through a sequence of projects that result in simple and useful programs. *Prereq. COM 1105 or equivalent. Not open to Computer Science majors.*

COM 1201 Algorithms and Data Structures 2 **4 QH**
Continues the study of algorithms, data structures, abstraction, and encapsulation. Introduces structures that utilize arrays and/or links in more sophisticated ways. Studies linked lists, trees, heaps, priority queues, and hashing. Discusses efficient sorting (quicksort and heapsort) and introduces experimental analysis or algorithms. Examines several design issues, including selection of structures based on what operations need to be optimized (insertion, deletion, traversal, searching, sorting, evaluation), encapsulation of algorithms using class and template techniques, and how and when to use recursion (versus explicit stack-based techniques). Introduces graph algorithms and structures if time permits. *Prereq. COM 1101 or equivalent.*

COM 1204 Object-Oriented Design **4 QH**
Introduces the philosophy and methodology of object-oriented software design and the techniques of object-oriented programming. Discusses the design and implementation of individual classes and the tradeoffs in designing collections of classes. Introduces class libraries and application frameworks. Examines simple design patterns and compares object-oriented design to other software design paradigms. Applies object-oriented design to several medium-sized projects. *Prereq. COM 1201 or permission of instructor.*

COM 1205 Software Design and Development **4 QH**
Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq. COM 1201, COM 1204.*

COM 1230 Introduction to UNIX Tools **4 QH**
Introduces the essentials of UNIX tool programming (with a bent toward systems administration) via the use of high-level programming languages, utilities, and toolkits. Topics include UNIX shells and essential utilities, Perl, Tcl/Tk, system and network security issues, and high-level networking and protocol basics. Provides students with an opportunity to learn the tools and programming languages that will help them make the best use of UNIX (and the myriad other operating systems where the tools have been ported). *This course does not qualify as a computer science elective, but computer science majors may take this course as a free elective.*

COM 1315 Database Design **4 QH**
Focuses on the use and properties of relational database management systems. Uses the entity-relationship model on example problems. Presents the SQL language. Topics may include indexing, query optimization, and object-oriented databases. Requires implementing a database schema and writing a short application program on a commercial database management system. *Prereq. COM 1101 or programming experience in a high-level language. Nonmajors with programming experience in C are welcome.*

COM 1317 Transaction Processing Systems **4 QH**
Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq. COM 1130, COM 1201, and COM 1315.*

COM 1330 Operating Systems **4 QH**
Introduces the basic concepts underlying computer operating systems and provides hands-on experience with their implementation. Covers the basic structure of an operating system: hardware and application interfaces, processes, threads, synchronization, interprocess communication, processor allocation, deadlocks, memory management, file systems, and input/output control. Uses examples from many real operating systems (UNIX, MS-DOS, Windows NT) to reinforce concepts. *Prereq. COM 1130 and COM 1201.*

COM 1335 Distributed Operating Systems **4 QH**
Covers distributed operating systems; communication: ATM, client-server, remote procedure call; processors, processes, and threads; distributed file systems; security. Uses case studies. Includes programming on workstations in labs. *Prereq. COM 1330.*

COM 1337 Computer Communication Networks **4 QH**
Introduces the underlying concepts and principles of computer networks. Presents the different components of a network and how these components fit together. Emphasizes the design and implementation of network software that transforms raw hardware into a richly functional communication system. Real networks (such as the Internet, ATM, Ethernet, Token Ring) will be used as examples to reinforce the concepts and demonstrate various protocols. Also covers applications such as electronic mail and the World Wide Web. Topics include introduction to communications connectivity and standards; layered architectures; ISO/OSI and TCP/IP reference models; data transmission, synchronization, and multiplexing; error handling, link control, and protocol operations; local area networks; network interconnection; high-speed networks; wide area networks; internetworking; transport layer services; and higher layers and applications. *Prereq. COM 1330.*

COM 1340 Recursive Thinking **1 QH**
Offers an introduction to recursive thinking, recursive data types, and to functions defined by induction of the structure of recursive data. *Prereq. COM 1201 and MTH 1137.*

COM 1350 Automata and Formal Languages **4 QH**
Covers finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; Turing machines, Church's thesis, and the halting problem; and applications to compilers, artificial intelligence, and pattern recognition. *Prereq. COM 1201 and MTH 1137.*

COM 1355 Compiler Design 1 **4 QH**
Implements lexical analyzers and parsers as specified by regular expressions and context-free grammars. Emphasizes the use of LALR(1) or LL(1) parser generators. Covers basic code generation. Uses a hands-on approach, including either a sequence of programming assignments or a project. *Prereq. COM 1130 and COM 1350.*

COM 1358 Analysis of Programming Languages **4 QH**
Covers run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq. COM 1102 and COM 1350.*

COM 1370 Computer Graphics **4 QH**
Focuses on characteristics and programming of graphics output devices. Presents basic point and line drawing, two-dimensional displays; clipping and windowing. Surveys pictures; data structures and display file organization; and interaction; graphical input and event-driven programs. Includes some three-dimensional drawing. *Prereq. COM 1201 and MTH 1301.*

COM 1390 Algorithms **4 QH**
Introduces the basic principles and techniques for the discovery, design, analysis, and implementation of efficient algorithms. Sample algorithms will be drawn from sorting and searching, graph algorithms, string matching algorithms, greedy algorithms, and dynamic programming. Analysis uses both theoretical and experimental techniques. The course concludes with a discussion of "hard problems" for which no efficient algorithms are known and will introduce the concept of NP-complete problems. *Prereq. COM 1350.*

COM 1391 Data **4 QH**
Examines methods and techniques for representation, organization, transformation, and security of data. Studies fundamental structures such as sets, graphs, and finite functions. Examples focus on large objects such as images, video, and sound, and on large systems such as file systems, data bases, and networks. *Prereq. COM 1390.*

COM 1400 Data Parallel Computing **4 QH**
Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines (with mesh or hypercube interconnections) and networks of workstations. Studies fundamental data structures and data parallel algorithms for matrix operations and fast fourier transforms. Examines graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments. *Prereq. COM 1390, MTH 1125, and MTH 1301.*

COM 1410 Artificial Intelligence **4 QH**
Focuses on approaches to making computers act intelligently by studying current methods for automated understanding, problem solving, optimal search, knowledge representation, vision, and learning. Students perform experiments with semantic nets, logical deduction systems, evidential reasoning systems, and/or neural nets. *Prereq. COM 1102, COM 1201.*

COM 1420 Principles and Methods in Interactive Systems Design **4 QH**
Introduces principles of human-computer interface design and methodologies of implementation, evaluation, and research in human-computer interaction. Topics include user psychology, dialog styles (menus/controls, command languages, icons, windows); screen layout and design, input devices (mouse, touchscreen, keyboard, voice); error handling and reporting; system response time; user documentation and help systems; and "intelligent" interfaces. Discusses techniques for the implementation and usability testing of human-computer interfaces. *Prereq. COM 1204 and COM 1370.*

COM 1621 Computer Science Seminar **1 QH**
Prepares students in methods of oral presentation of a topic in computer science. Describes techniques in preparation of overheads and other visual aids and their appropriate and effective use. Requires students to give a 20–30 minute oral presentation with overheads on a topic of their choice. *Prereq. Computer science seniors only.*

COM 1721, COM 1722, COM 1723 **1 QH each**
Freshman Honors Seminar 1, 2, and 3
Offers a seminar course for freshman honors students in computer science and for freshman honors students in other majors who are concurrently taking COM 1100, COM 1101, or COM 1201, respectively, or who have completed these courses. Introduces a variety of topics that extend the material in the standard freshman computer science courses or go beyond the scope of these courses. *Prereq. Enrollment in the honors program or permission of the instructor.*

COM 1770 Computer Science Seminar (Honors) **4 QH**
Offers a capstone course for computer science honors students. Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one-hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic. *Prereq. Computer science seniors in the honors program or permission of instructor.*

COM 1777 Honors Adjunct Computer Science **1 QH**
Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science **4 QH**
Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. *Prereq. Permission of the instructor; may be repeated for credit.*

COM 1805 Readings in Computer Science **2 QH**
Selected readings under the supervision of a faculty member. *Prereq. COM 1100, COM 1101, COM 1201, COM 1204, and permission of instructor. May be repeated for credit.*

COM 1810 Topics in Computer Science **4 QH**
Lectures by faculty on current topics in computer science. Topics vary from quarter to quarter. *Prereq. COM 1100, COM 1101, COM 1201, COM 1204, and permission of instructor. May be repeated up to three times for credit with changes in topics.*

COM 1820 Computer Science Undergraduate Thesis **4 QH**
Interested students should contact the College for approval and registration information. *Prereq. COM 1100, COM 1101, COM 1201, COM 1204, and permission of thesis adviser and approval of the Undergraduate Committee.*

COM 1821 Computer Science Undergraduate Thesis Continuation **4 QH**
Prereq. COM 1820. May be repeated for credit.

COM 1830 Computer Science Undergraduate Project **4 QH**
Offer students the opportunity to develop a computer software or hardware artifact under the supervision of a project adviser. *Prereq. COM 1100, COM 1101, COM 1201, COM 1204, and permission of the project adviser. May be repeated for credit with approval of the Undergraduate Committee.*

COM 1831 Computer Science Undergraduate Project Continuation **4 QH**
Prereq. COM 1830. May be repeated for credit.

Cooperative Education

COP 1135 Professional Development for Journalists **1 QH**
Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self-exploration.

COP 1180 Career Decision-Making **4 QH**
Focuses on needs and concerns of students who are undecided or uncertain about their academic major or career direction. Students identify their work values, interests, skills and personality preferences as these relate to choice of major and career options. Provides students with the opportunity to explore various careers through researching in the Career Resource Center, conducting informational interviews with professionals in their fields of interest, and using the Internet. Discusses how labor market trends and workplace issues impact career choice. Emphasizes decision-making and goal setting strategies. *Prereq. Freshmen or sophomores in any major or permission of instructor.*

COP 1220 Working in the United States **4 QH**
Helps international students compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American workforce. Considers work-oriented cross-cultural issues, the American work ethic, skills development, résumé writing, and interviewing techniques. *Prereq. International students prior to first co-op experience or permission of instructors.*

COP 1314 Life/Career Planning **4 QH**
Assists students with the transition from school to the workplace. Students identify their career interests and values, and assess skills and personality preferences to help them make better career decisions. Emphasizes labor market issues, job search techniques, networking and career management strategies. Prepares students for the job search process by requiring them to complete a professional résumé, participate in videotaped mock interviews, and research companies. *Prereq. Junior or senior standing or permission of instructor.*

COP 1350 Pharmacy Co-op Seminar 1 **1 QH**
Introduces and prepares the pharmacy student for the experiential component of the pharmacy curriculum. Introduces the student to policies and procedures of the Department of Cooperative Education. Provides students with the opportunity to develop the skills necessary to be successful in the preparation, activity, and reflection components of the cooperative education curriculum. Offers students the opportunity to gain an understanding of the various opportunities that are available to them in the profession of pharmacy.

COP 1360 Athletic Training Co-op Seminar **1 QH**
Introduces and prepares athletic training students for the experiential component of the athletic training curriculum. Introduces students to policies and procedures of the Department of Cooperative Education. Provides students with the opportunity to develop the skills necessary to be successful in the preparation, activity, and reflection components of the cooperative learning curriculum. Offers students the opportunity to develop job search techniques and job survival skills.

COP 1370 Nursing Career Management **1 QH**
Students will have an opportunity to identify skills; develop job-finding, job-survival, and career management skills; and learn about the nursing co-op program.

Criminal Justice

CJ 1001, CJ 1002 Critical Issues in Criminal Justice 1 and 2 **2 QH each**
Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1101 Administration of Criminal Justice **4 QH**
Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1151 Introduction to Law and the Legal Process 1 **4 QH**
Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2 **4 QH**
Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq. CJ 1151 and CJ 1252.*

CJ 1160 Diversity in Criminal Justice **4 QH**
Focuses on the rights, fears, and aspirations of individuals with regard to the increasing diversity of the criminal justice workforce and clientele. Investigates the myths and realities surrounding race, gender, social class, crime, and the roles these issues have played in criminal sentencing, particularly in serious cases that may involve the death penalty, as well as the impact of the increasing diversity of the criminal justice workforce. Examines bias-motivated violence as a case study of diversity issues and criminal justice response.

CJ 1201 Criminology **4 QH**
Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law **4 QH**
Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process **4 QH**
Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq. CJ 1251.*

CJ 1253 Introduction to Criminal Courts **4 QH**
Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq. CJ 1251 and CJ 1252.*

CJ 1254 Civil Liability in Criminal Justice **4 QH**
Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public-policy issues, and methods of reducing the risk of civil liability. *Prereq. CJ 1251 and CJ 1252.*

CJ 1255 Introduction to Juvenile Law **4 QH**
Introduces the way society responds to juvenile offenders. Topics studied may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court. *Prereq. HCJ 1252 and junior or senior only.*

CJ 1301 Introduction to Security **4 QH**
Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1302 Theories of Investigation **4 QH**
Examines the commonalities and differences between criminal and noncriminal investigations, using various sources of information, and legal constraints imposed on investigators. Studies how forensics helps investigators in criminal investigations. Discusses interviewing techniques, report writing, and giving testimony.

CJ 1311 White-Collar Crime **4 QH**
Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the interagency and jurisdictional problems and the benefits of cooperation.

CJ 1312 Organized Crime **4 QH**
Examines the myths and realities of what is termed organized crime. Discusses the nature of organized crime and factors that contribute to it, as well as measures taken by society to curb its activities. Addresses the impact of organized crime on American society and its implications, both economic and political. Analyzes the characteristics of organized criminal enterprises and the variety of such groups operating in the United States as well as on the international level.

CJ 1314 Security Management and Supervision **4 QH**
Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq. CJ 1301 or equivalent.*

CJ 1318 Terrorism **4 QH**
Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations **4 QH**
Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1320 Service Industry Security **4 QH**
Studies the various losses encountered by the retailing, lodging, entertainment, and transportation industries attributable to the conduct of customers and guests and the employees who serve them, and on whom they must rely for their existence. Addresses security's role in helping prevent losses that are unique to each of these businesses, whether due to criminal or other causes.

CJ 1401 Police Administration and Management **4 QH**
Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to policing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.

CJ 1411 Police Strategy **4 QH**
Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq. CJ 1401.*

CJ 1424 Seminar in Policing **4 QH**
Specific topic in policing to be announced. *Prereq. CJ 1401, CJ 1411, and junior standing or above.*

CJ 1426 Topics in Policing **4 QH**
Specific topic in policing to be announced. *Prereq. Junior standing or above.*

CJ 1427, CJ 1428, CJ 1429, CJ 1430 Topics in Criminal Justice **4 QH each**
Specific topics in criminal justice to be announced. *Prereq. Middler standing or above.*

CJ 1453 Criminal Justice Research Methods **4 QH**
Examines basic concepts in conducting criminal justice research. Students become familiar with research techniques that are necessary for systematic analysis of the criminal justice system, offenders' behavior, crime trends, program effectiveness, problem analysis, etc. Requires that students actively pursue such techniques as research interviewing, data coding, and preliminary analysis in and outside of class. *Prereq. MTH 1010 or equivalent.*

CJ 1454 Criminal Justice Statistics **4 QH**
Focuses on the use of statistics with special emphasis on criminal justice applications and the analysis of criminal justice data. Covers basic descriptive statistics, including levels of measurement, measures of central tendency, and measures of variability. Introduces the student to inferential statistics, including the normal curve, sampling error and confidence intervals, hypothesis testing, chi-square, and correlation. *Prereq. HCJ 1453.*

CJ 1511 Survey of Criminal Evidence **4 QH**
Focuses upon the fundamentals of criminal trial procedure and the rules of evidence as they apply to the trial of a criminal case. Students are required to read and brief criminal court cases. *Prereq. CJ 1251 and CJ 1252.*

CJ 1512 Seminar in Law and Criminal Justice **4 QH**
Specific topic in the law and criminal justice to be announced. *Prereq. CJ 1251, CJ 1252, and junior or senior standing.*

CJ 1513 Criminal Homicide **4 QH**
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide, emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.

CJ 1601 Prisons and Corrections **4 QH**
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq. CJ 1201.*

CJ 1612 Juvenile Justice **4 QH**
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq. SOC 1100 and CJ 1201.*

CJ 1613 Probation and Parole **4 QH**
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq. CJ 1601.*

CJ 1615 Crime and Criminal Justice: A Comparative View **4 QH**
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq. CJ 1101, SOC 1100, or equivalent.*

CJ 1616 Women and the Criminal Justice System **4 QH**
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq. Middler standing or above.*

CJ 1618 Victims of Crime **4 QH**

Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.

CJ 1622 Alternatives to Incarceration **4 QH**

Explores what is now known about sentencing models used throughout the United States and assesses how well they fulfill societal demands for incapacitation, retribution, and deterrence. Compares substantive differences in various forms of punishment, including intermediate sanctions such as house arrest and electronic monitoring. Examines process issues such as choosing appropriate target populations and decision points where intermediate sanctions may be used. *Prereq. Junior or senior status.*

CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study **4 QH each**

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 **4 QH**
Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq. CHM 1132 and CHM 1138; CHE 1205 taken concurrently.*

CHE 1202 Chemical Engineering Calculations 2 **4 QH**
Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq. CHE 1201.*

CHE 1205 Computation Laboratory **2 QH**
Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq. CHE 1201 taken concurrently.*

CHE 1211 Chemical Engineering Thermodynamics 1 **4 QH**
Covers the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq. CHE 1201 and CHE 1205.*

CHE 1310 Chemical Engineering Thermodynamics 2 **4 QH**
Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq. CHE 1211.*

CHE 1321 Momentum Transport **5 QH**
Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq. CHE 1211 and CHE 1202.*

CHE 1415 Experimental Methods 1 **5 QH**
Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data-handling techniques. Lab fee. *Prereq. CHE 1321 and ENG 1125.*

CHE 1416 Experimental Methods 2 **5 QH**
Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq. CHE 1415 and ENG 1125.*

CHE 1421 Chemical Engineering Kinetics **4 QH**
Covers fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq. CHE 1310.*

CHE 1431 Heat Transport **5 QH**
Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq. CHE 1321.*

CHE 1441 Separation Processes **5 QH**
Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq. CHE 1431.*

CHE 1450 Chemical Engineering Economics **4 QH**
Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq. ECN 1115.*

CHE 1501 Chemical Process Design 1 **6 QH**
Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq. CHE 1421 and CHE 1441.*

CHE 1502 Chemical Process Design 2 **6 QH**
Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq. CHE 1501.*

CHE 1503 Projects 1 **6 QH**
Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Lab fee. *Prereq. Senior standing and permission of department.*

CHE 1504 Projects 2 **6 QH**
Continues the research work begun in CHE 1503. Lab fee. *Prereq. CHE 1503.*

CHE 1511 Mathematical Methods in Chemical Engineering **4 QH**
Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced

mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1512 Chemical Process Control **4 QH**
Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq. Senior standing.*

CHE 1514 Special Topics **4 QH**
Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq. Senior standing.*

CHE 1516 Mass Transfer Operations **4 QH**
Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1519 Polymer Science **4 QH**
Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq. CHE 1421 and CHM 1272; Advanced Chemistry elective.*

CHE 1520 Pollution Control in Chemical Industries **4 QH**
Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1524 Chemical Process Safety **4 QH**
Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1530 Biochemical Engineering Fundamentals **4 QH**
Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq. Senior standing; Chemical Engineering elective.*

CHE 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times, as it can be adjunct to any chemical engineering course. *Prereq. Permission of department.*

CHE 1796 Honors Project 1 **4 QH**
Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq. Permission of department.*

CHE 1797 Honors Project 2 **4 QH**
Continues CHE 1796. *Prereq. CHE 1796.*

Civil and Environmental Engineering

CIV 1210 Structural Mechanics 1 **4 QH**
Covers statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq. MTH 1223 taken concurrently and PHY 1222.*

CIV 1211 Structural Mechanics 2 **4 QH**
Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq. CIV 1210.*

CIV 1220 Structural Analysis 1 **4 QH**
Reviews reactions, shear and bending-moment diagrams, bar forces in trusses, deflections by virtual work, and moment-area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq. CIV 1211.*

CIV 1222 Structural Analysis 2 **4 QH**
Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq. CIV 1220, CIV 1226, and MTH 1230.*

CIV 1226 Structural Analysis and Design Laboratory **2 QH**
Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq. CIV 1220 taken concurrently.*

CIV 1240 Concrete Design 1 **4 QH**
Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq. CIV 1220.*

CIV 1241 Concrete Design 2 **4 QH**
Covers various topics including design of slender columns, foundations, and multistory buildings with one-way and two-way floor systems. *Prereq. CIV 1240.*

CIV 1250 Steel Design 1 **4 QH**
Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq. CIV 1220 taken concurrently.*

CIV 1251 Steel Design 2 **4 QH**
Discusses topics including design of steel plate girders, composite construction in bridges and buildings, plastic analysis and design, and the design of high-rise buildings subject to lateral loads. *Prereq. CIV 1250.*

CIV 1295 Structural Design Projects **4 QH**
Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq. CIV 1240 and CIV 1250; CIV 1241 or CIV 1251 or CIV 1245; and senior standing. CIV 1222 taken concurrently.*

CIV 1310 Fluid Mechanics **4 QH**
Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq. CIV 1210.*

CIV 1320 Hydraulic Engineering **4 QH**
Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe-pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq. CIV 1310.*

CIV 1340 Environmental Engineering 1 **4 QH**
Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq. CHM 1132.*

CIV 1341 Environmental Engineering 2 **4 QH**
Concentrates on unit operations, unit processes, and related fundamental design of physical, chemical, and biological water and wastewater treatment systems. Typical topics include aeration systems, activated sludge, fixed-film biological treatment, gas transfer, reaction kinetics, reactor modeling, sedimentation, filtration, and subsurface disposal system design. *Prereq. CIV 1310 and CIV 1340.*

CIV 1350 Environmental and Hydraulics Design Laboratory **4 QH**
Presents lectures and laboratory experiments in the areas of hydraulic and environmental engineering. Laboratory experiments have related design projects that will allow the student to investigate a unit operation or process in some depth. Topic areas covered include several of the following: wastewater neutralization, biological treatment, coagulation, oxygen demand, oxygen transfer, sedimentation, weirs, pumps, ion exchange, carbon absorption, and disinfection. *Prereq. CIV 1320 taken concurrently and CIV 1340.*

CIV 1370 Air Pollution **4 QH**
Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air-quality criteria and standards. *Prereq. Junior standing.*

CIV 1395 Environmental Design Projects **4 QH**
Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq. CIV 1320, CIV 1341, CIV 1350, and senior standing.*

CIV 1410 Soil Mechanics **4 QH**
Studies soil classification, soil-water phase relations, groundwater seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq. CIV 1211; or CIV 1510.*

CIV 1411 Soil Mechanics Laboratory **2 QH**
Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq. CIV 1410 taken concurrently.*

CIV 1420 Foundation Engineering **4 QH**
Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq. CIV 1410.*

CIV 1495 Geotechnical Design Projects **4 QH**
Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth-retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq. CIV 1420 and senior standing.*

CIV 1510 Materials **4 QH**
Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq. CHM 1131.*

CIV 1511 Materials Laboratory **2 QH**
Uses standard tests and equipment in the lab to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, and others. *Prereq. CIV 1510 taken concurrently.*

CIV 1530 Transportation Analysis and Planning **4 QH**
Studies the analysis and demand prediction for urban passenger transportation and travel-demand forecasting by the traditional four-step method and other methods. Discusses impact assessment, including traffic, environmental, and economic impacts. Topics also include the history of urban transportation and analysis of current policy issues. *Prereq. MTH 1123.*

CIV 1540 Highway Engineering **4 QH**
Presents an overview of highway engineering, including route selection, geometric design, pavement design, drainage, construction, and maintenance. Discusses highway administration, financing, costs, planning and the environmental impact process, and traffic engineering fundamentals for highways. *Prereq. CIV 1620.*

CIV 1550 Construction Management **4 QH**
Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq. Junior standing.*

CIV 1595 Transportation Design Projects **4 QH**
Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet-size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq. CIV 1530, CIV 1540, CIV 1630 taken concurrently, CIV 1640, and senior standing.*

CIV 1620 Engineering Measurements **4 QH**
Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq. MTH 1124 and PHY 1221.*

CIV 1621 Engineering Measurements Laboratory **2 QH**
Examines field problems, illustrating and applying the lecture material in CIV 1620 with computer applications. *Prereq. CIV 1620 taken concurrently.*

CIV 1640 Applied Probability Theory for Civil Engineers **4 QH**
Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq. MTH 1223.*

CIV 1650 Legal Aspects of Civil Engineering **4 QH**
Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq. Junior standing.*

CIV 1665 Professional Issues for Civil Engineers **1 QH**
Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration. *Prereq. Junior standing.*

CIV 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors) **4 QH**
Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

CIV 1797 Independent Study/Research 2 (Honors) **4 QH**
Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq. CIV 1796.*

CIV 1810 Special Topic in Civil Engineering **4 QH**
This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq. Permission of instructor.*

CIV 1820 Special Project in Civil Engineering **4 QH**
Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq. Outstanding academic performance.*

CIV 1821 Special Project in Civil Engineering **2 QH**
For students wishing to spread an independent project over two quarters. Taking CIV 1821 twice is equivalent to taking CIV 1820. Can be taken over two quarters, with students registering for each quarter.

Electrical Engineering

ECE 1171 Electrical Engineering 1 **4 QH**
Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff's laws. Discusses selected topics that illustrate the variety of applications of electrical engineering, such as AC circuits and electric

power, the basics of semiconductor devices with application to transistor amplifier models, transients in circuits with energy storage, digital signals, logic circuits, and some basic concepts of computer operation, specifically number coding, arithmetic operations, and memory circuits. *Prereq. MTH 1125; not open to electrical engineering majors.*

ECE 1178 Digital Electronics for Computer Science Majors **4 QH**
Introduces electronic digital circuits preparing computer science majors for ECE 1382. Starts with the basics of electronic circuit analysis and continues with the principles of MOS and bipolar semiconductors and their applications to logic gate circuits. Discusses logic circuit design supplemented by hardware considerations: level tolerance, power dissipation, gate, and component count. Introduces circuits with RC time constants to explain delays and speed limitations of logic circuits. Describes basic logic array circuits with application to ROM and PROM. *Not open to electrical engineering majors.*

ECE 1215 Circuits 1 **4 QH**
Introduces the basic laws and the basic signal and device models used in the study of linear circuits. Topics include Kirchhoff's Laws and Tellegen's Theorem, node-voltage and mesh-current analysis, circuit reduction, and the Thevenin and Norton Theorems. Introduces three-terminal and dependent source models, with extensive coverage of the ideal operational amplifier model. Discusses various common signal models, including step functions, exponentials, sinusoids, first- and second-order circuits and the solution of the related differential equations. *Prereq. ECE 1240, MTH 1125, MTH 1225 and PHY 1223. (MTH 1225 may be taken concurrently.) ECE 1241 must be taken concurrently.*

ECE 1226 Discrete Systems Laboratory **1 QH**
Consists of four experiments that are closely integrated with the ECE 1333 course lectures. The first two experiments are concerned with A/D aliasing and quantization, the third with gain and phase-shift, and the fourth with the Discrete-Time Fourier Transform. *ECE 1333 must be taken concurrently.*

ECE 1227 Electromagnetic Fields Laboratory **1 QH**
Supports class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line electrical length measurement; reflection and impedance measurements of dipole antenna; frequency characteristics of antennas and waveguides; antenna mutual coupling; and radiation pattern determination. *ECE 1364 must be taken concurrently.*

ECE 1228 Energy Devices Laboratory **1 QH**
Investigates transformers and DC machines; conducts tests to model the energy device and evaluate its load characteristics, thereby supporting the theory learned in ECE 1370. *ECE 1370 must be taken concurrently.*

ECE 1229 Digital Systems Laboratory **1 QH**
Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices, including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence detectors and other digital subsystems such as a parallel binary divider or digital calculator. Covers the use of a field programmable gate array for implementing the design. *ECE 1382 must be taken concurrently.*

ECE 1230 VLSI System Design Laboratory **2 QH**
Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Designs can be sent to MOSIS for fabrication. *ECE 1351 must be taken concurrently.*

ECE 1231 Power Systems Laboratory **1 QH**
Applies techniques covered in ECE 1472, addressing topics such as transmission line constants, load flow and short-circuit studies, and transient stability. Includes upgrading the design of a small power system. *ECE 1472 must be taken concurrently.*

ECE 1232 Electric Machines Laboratory **2 QH**
Investigates topics in electromechanical energy conversion employing Faraday's Law Machine Bench. Studies steady-state and transient-state behavior of induction, synchronous, and DC machines. *ECE 1371 must be taken concurrently.*

ECE 1233 Semiconductor Processing Laboratory **2 QH**
Covers fabrication and testing of MOS integrated circuits. Students compare process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Lab work includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated integrated circuits will be electrically characterized. *ECE 1406 must be taken concurrently.*

ECE 1234 Digital Signal Processing Laboratory **2 QH**
Focuses on practical aspects of DSP by programming a digital signal processing chip in its native assembly language. Topics include, but are not limited to, input/output operations via A/D and D/A converters, digital frequency synthesis, computation of discrete time convolution, and design and implementation of both FIR and IIR digital filters. *ECE 1456 must be taken concurrently.*

ECE 1235 Control Systems Laboratory **1 QH**
Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog computer simulation, digital computer control, and use of CAD packages such at MATLAB for analysis and design of control systems. Experiments with PID control emphasize classical methods of feedback compensation, and an experiment with modern techniques of state variable feedback considers digital speed control of a DC motor. *ECE 1420 must be taken concurrently.*

ECE 1238 Microprocessor Laboratory **2 QH**
Provides students with the opportunity to practice the theory being learned concurrently in ECE 1383. Consists of four laboratory exercises and a small project executed by groups of three students using a modern single-board computer and associated test and development equipment. Exercises cover topics including memory expansion, memory testing, I/O hardware and I/O drivers, and interrupt driver control. Requires students to integrate software and hardware to make the system perform some complete task.

ECE 1240 Introduction to Electrical Engineering Laboratory **1 QH**
Provides a hands-on introduction to electronic circuits, devices, and measurement techniques. Students will design, assemble, and test a wireless switch for remote control of household appliances. Develops this system using an infrared (IR) diode transmitter, a light-sensitive phototransistor receiver and additional digital and analog interface circuitry. Uses the switch to remotely control a household appliance, such as a lamp or radio, using an electromechanical relay. *Prereq. GE 1101, PHY 1223.*

ECE 1241 Circuits Laboratory **1 QH**
Covers experiments reinforcing basic circuit theory topics such as equivalent circuits, voltage/current divider applications, potentiometers or the Wheatstone bridge, experimental verification of network theorems, operational amplifier behavior, and/or response of RL, RC, and RLC circuits. *Prereq. ECE 1240, MTH 1125, MTH 1225. ECE 1215 must be taken concurrently.*

ECE 1242 Electronics Laboratory 1 **1 QH**
Includes experiments such as characterization of diodes, BJTs, and mosfets. Allows students to design such circuits as multistage amplifiers and photoswitches. *ECE 1341 must be taken concurrently.*

ECE 1243 Electronics Laboratory 2 **1 QH**
Includes experiments using integrated circuit current mirrors, differential amplifiers, frequency response, and feedback. *ECE 1342 must be taken concurrently.*

ECE 1246 Circuits 2 **4 QH**
Presents the unilateral Laplace transform as a technique for solving differential equations with initial conditions that model linear circuit behavior, followed by the introduction of Laplace transform equivalent circuit models. Uses s-domain analysis for the solution of linear circuit problems, including node-voltage and mesh-current methods. Covers several topics connected to the use of network functions including pole/zero plots, frequency response, and a brief treatment of the synthesis of circuits to match given transfer functions. Considers circuits in the sinusoidal steady-state, first introducing phasor representations, then applying phasors to analyze resonance, ideal and linear transformers, and complex power and three-phase systems. *Prereq. ECE 1215.*

ECE 1308 Physical Electronics **4 QH**
Develops elements of solid-state theory including crystal structure, quantum theory of the atom, and carrier (electron and hole) transport theory. Uses this knowledge to explore devices commonly used in modern electronic circuits, including p-n junction diodes, Schottky barrier diodes, MOS transistors, and bipolar junction transistors. Designed to provide the preparation for advanced study in the areas of integrated circuit fabrication, VLSI design, and electronic design. *Prereq. ECE 1342.*

ECE 1332 Linear Systems 1 **4 QH**
Discusses continuous systems first from the time domain viewpoint and then from the frequency domain viewpoint. Begins the time domain presentation with a general discussion of systems as a mapping followed by a discussion of time-invariance. Presents linear time-invariant system theory in detail including topics such as convolution, causality, stability, system interconnections, and the system sinusoidal response. Begins the frequency domain presentation with a discussion of the Fourier transform as a basis for the development of the bilateral Laplace transform and the s-plane. Discusses the Fourier and Laplace transforms and their properties, and develops, in terms of these transforms, system aspects such as causality, stability, and the system analysis. Uses the s-plane viewpoint to study the stability of feedback systems and the system gain and phase-shift. *Prereq. ECE 1246 and MTH 1225.*

ECE 1333 Linear Systems 2 **4 QH**
Begins with an analysis of A/D and D/A conversion, and includes aliasing ideal D/A conversion, and A/D quantization. Discusses the analysis and realization of linear shift-invariant discrete systems. System concepts taught in ECE 1332 provide the basis for development. Presentation includes such topics as convolution, causality, stability, system interconnections, and the system sinusoidal response. This motivates a presentation of Discrete-Time Fourier Series, the Discrete-Time Fourier Transform, and the Z-Transform. Discusses system aspects such as causality, stability, and system analysis in terms of this transform. Lastly, the z-plane analysis of gain and phase-shift is presented. *Prereq. ECE 1332. ECE 1226 must be taken concurrently.*

ECE 1341 Electronics 1 **4 QH**
Introduces the analysis and design of modern electronic circuits, as well as the operation of the principal semiconductor devices: diodes, field-effect transistors, and bipolar junction transistors. Focuses on using large- and small-signal semiconductor device models to understand the operation of single stage amplifiers and logic gates. *Prereq. ECE 1215; ECE 1242 must be taken concurrently.*

ECE 1342 Electronics 2 **4 QH**
Develops the analysis techniques required to design analog circuit functions, primarily amplifiers. Discusses feedback, frequency response, stability, and compensation. Addresses topics such as biasing, single and compound amplifier stages, feedback amplifiers including impedance, Nyquist's stability criterion, and compensation of feedback amplifiers. *Prereq. ECE 1246 and ECE 1341; ECE 1243 must be taken concurrently.*

ECE 1343 Electronic Design 1 **4 QH**
Develops analysis and design techniques for digital and mixed analog/digital circuits. Recommended for students interested in working in the integrated circuit industry, or with electronic hardware. Examines CMOS and ECL logic families, multivibrators, Schmitt triggers and comparators, pulse generators, sample and hold circuits, and D/A and A/D converters. *Prereq. ECE 1342.*

ECE 1344 Electronic Design 2 **4 QH**
Extends the concepts of Electronics 2 and Electronic Design 1 to a variety of signal processing circuits. Requires students to do at least three major circuit designs, which may include the following: active filters, analog multipliers, saw-tooth generators, sinusoidal oscillators, switching power supplies, and electronic sensors. *Prereq. ECE 1343.*

ECE 1351 Special Topics in IC Design **4 QH**
Offers a structured digital MOS design course in designing, verifying, and fabricating CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RC delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq. ECE 1382; ECE 1230 must be taken concurrently.*

ECE 1355 Communication Systems 1 **4 QH**
Introduces basic concepts of digital communication in additive white Gaussian noise (AWGN) channels. Reviews Fourier transform and Fourier Series representation of signals and introduces random processes. Examines power spectrum density, geometric representation of signals and signal spaces, concepts of information sources and source coding algorithms, principles of optimum receiver design for AWGN channels, correlation and matched filter receivers, and probability of error analysis for binary and M-ary signaling through AWGN channels, digital PAM transmission through band-limited AWGN channels, zero ISI condition, system design in the presence of channel distortion, design of optimum transmitting and receiving filters, channel equalization, introduction to digital transmission via carrier modulation. *Prereq. MTH 1384 and ECE 1333.*

ECE 1363 Electromagnetic Fields 1 **4 QH**
Develops the fundamental equations of electromagnetics and presents applications. Introduces the mathematics necessary for electromagnetics: complex vector phasors and vector calculus. Defines the electromagnetic field with the Lorentz force equation. Presents and applies Coulomb's and Biot-Savart's laws. Explains the macroscopic constitutive relations. Formulates Maxwell's equations in both integral and differential form. Develops Poynting's theorem. Presents the principles for the operation of generators and motors. Derives the wave equation and studies the uniform plane wave solution in both time and frequency domain. Concludes with the reflection and transmission of plane waves. *Prereq. MTH 1223, MTH 1225, and PHY 1223.*

ECE 1364 Electromagnetic Fields 2 **4 QH**
Studies electrodynamic applications of electromagnetic field theory: lossless transmission lines, waveguides, optical fibers, and antennas. Develops transmission line theory by use of distributed circuit elements and introduces the TEM waves. Obtains solutions analytically and also graphically using the Smith Chart. Seeks TM and TE solutions for parallel-plate waveguides and general rectangular metal waveguides. Examines optical fibers after a study of uniform plane wave refraction. Investigates the radiation properties of electric dipoles and studies the enhancement of directivity using phased arrays. *Prereq. ECE 1363; ECE 1227 must be taken concurrently.*

ECE 1366 Computational Electromagnetics **4 QH**
Presents numerical and computational approaches to electromagnetic field problems, as well as engineering applications. Gives students the opportunity to use software environments such as Matlab to implement the various algorithms for solution and to present graphical results. Begins with an introduction to computation methods and linear algebra. Uses the finite difference method approach for solving the major partial differential equations of electromagnetics: Poisson's equation, the diffusion equation, and the wave equation. Also uses the FDTD approach to solve the wave equation. Presents the Rayleigh-Ritz method and the method of weighted residuals. Introduces integral equations as foundation for solving problems with the method of moments. Makes applications to the transmission lines, waveguides, resonators, antennas, and to antenna arrays. *Prereq. ECE 1364.*

ECE 1370 Electric Energy Devices **4 QH**
Reviews phasor diagrams and three-phase circuits, and presents magnetic aspects including magnetic circuits, energy storage, and permanent magnets. Includes other topics such as elements of transformers, principles of electromechanical energy conversion, and steady-state theory of induction, synchronous, and DC machines. *Prereq. ECE 1246, ECE 1363; ECE 1228 must be taken concurrently.*

ECE 1371 Electric Drives and Motion Systems **4 QH**
Continues ECE 1370. Presents steady-state theory and performance of induction, synchronous, and DC machines. Investigates transients and dynamics of AC and DC machines. Introduces power semiconductor controlled drives. *Prereq. ECE 1370; ECE 1232 must be taken concurrently.*

ECE 1379 Analysis of Electrical Transients **4 QH**
Focuses on transient behavior where tools of linear, time-invariant analysis are inoperative. Draws examples from the power system and from computer interconnections. Studies topics and methods of broad interest in all of electrical engineering, exploring events such as communication over long and short transmission lines, circuit breaker action, transient recovery voltage, restrike, transient inrush current, geomagnetically induced currents, ferroresonance and capacitor flashover using piecewise-linear analysis techniques. Uses Matlab and Excel to attack real problems. Examines the real-world non-LTI behavior of transformers, transmission lines, circuit breakers, surge arresters, and lightning. Gives students the opportunity to do an analysis project, in which they model mathematically some transient event that they create in the lab or extract from the literature and then evaluate how well their mathematical model describes reality. *Prereq. ECE 1333 and ECE 1342.*

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture **4 QH**
Presents the visible architecture of a modern computer. Uses assembly language programming to develop a foundation on the hardware that executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq. GE 1101 or equivalent.*

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits **4 QH**
Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using state-of-the-art CAD tools to develop facility in the design and testing of functional digital circuits. *Prereq. ECE 1381; ECE 1229 must be taken concurrently.*

ECE 1383 Computer Engineering 3: Microprocessor-Based Design **4 QH**
Provides an introduction to both hardware and software issues in interfacing microprocessors to their local and outside worlds. Includes lab and lecture components to develop both analytical

understanding and design skills. Examines the following hardware items: bus characteristics, timing and protocols; memory organization; memory-mapped I/O; and interrupts. Studies complementary software topics including polling versus interrupt driven I/O and exception processing. *Prereq. ECE 1382; ECE 1238 must be taken concurrently.*

ECE 1384 Computer Engineering 4: Computer Organization and Design **4 QH**
Provides a coherent, structured overview of the current state of Computer Organization and Design. Studies the strategies for attaining high performance using the instruction set of a real architecture. Focuses on the forces that drive cost/performance decisions to achieve successful designs. Highlights design principles based on the interactions of hardware and software. Topics include performance metrics, machine language, processor data path and control path designs, pipelining, memory hierarchies, I/O devices and interfacing techniques, and parallel processing. Provides a deeper understanding of design and performance issues in laboratory exercises using software simulators. *Prereq. ECE 1383.*

ECE 1385 Computer Engineering 5: Introduction to Robotics **4 QH**
Teams two students together to design and implement a small mobile robot system to complete a specific task. Students compete their robots against robots built by other teams at the end of the course. Develops students' design capabilities of microprocessor-controlled systems with input from sensory devices and output actuators. Topics include actuators, sensors, and system modeling. *Prereq. ECE 1333 and ECE 1383.*

ECE 1386 Computer Engineering 6: Data Structures, Algorithms, and Emerging Programming Models **4 QH**
Presents a survey of many common data structures and algorithms, all in the context of an object-oriented programming model. *Prereq. ECE 1381.*

ECE 1390 Senior Project Laboratory 1 **2 QH**
Allows students to work with a faculty adviser on a term project, either experimental or theoretical. *Prereq. Permission of department.*

ECE 1391 Senior Project Laboratory 2 **2 QH**
Continues the project started in ECE 1390 or it may be a new project. *Prereq. Permission of department.*

ECE 1400 Special Topics **4 QH**
Covers various topics from term to term, depending on the interests of the department and the students. *Prereq. Permission of department.*

ECE 1406 Integrated Circuit Fabrication **4 QH**
Provides an overview of integrated circuit fabrication from the viewpoint of the process engineer. Focuses on the physics, chemistry, and technology of integrated circuit fabrication. Uses the industry-standard process simulator SUPREM-IV to supplement analytical process models. Expands on the semiconductor device background learned in ECE 1308. Reviews MOS operation and device models in conjunction with testing of the integrated circuit fabricated in the lab (ECE 1233). Concentrates on silicon IC technology, but also discusses other material systems and microstructures including GaAs and microsensors. *Prereq. ECE 1308; ECE 1233 must be taken concurrently.*

ECE 1420 Control Systems **4 QH**
Introduces the analysis and design of classical control systems and comprises closely coupled lectures and laboratory experiments. Examines control system concepts, basic components and goals, modeling and mathematical description, transfer function and state variable representations, feedback control system characteristics, system responses, and stability of feedback systems. Also addresses analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq. ECE 1333 and ECE 1342; ECE 1235 must be taken concurrently.*

ECE 1455 Communication Systems 2 **4 QH**
Presents the state-of-the-art theory and techniques used in digital communication systems. Covers data compression techniques and rate-distortion theory, digital communication and system performance analysis in a variety of channel models, channel capacity, and coding for reliable communication, block and convolutional coding and decoding, trellis-coded modulation, direct sequence and frequency hopped spread spectrum systems. *Prereq. ECE 1355.*

ECE 1456 Digital Signal Processing **4 QH**
Introduces concepts in modern signal processing. Topics include review of discrete time signals and systems, discrete Fourier transform, realizations structures for digital filters, FIR filter design, IIR filter design, fast Fourier transforms, and applications to fast convolution. *Prereq. ECE 1333; ECE 1234 must be taken concurrently.*

ECE 1458 Communication Networks **4 QH**
Presents an overview of modern communication networks and basic principles of network design. Discusses types of traffic, multiplexing, and switching techniques. Uses layered network architectures, such as OSI (Open System Interconnection), and Internet and LAN (Local Area Network) architectures to explain the hierarchy of network functions. Studies data-link layer protocols including the commonly used Stop and Go, Go Back N and Selective repeat protocols. Propagation characteristics in optical cables are used for Physical layer study, including packet framing, synchronization, and error control. Discusses medium-access control (MAC) methods including the Aloha protocol used in packet radio networks, Carrier Sense Multiple Access, Ethernet and Fast Ethernet, Token Ring and Token Bus protocols, FDDI (Fiber Distributed Data Interface) and DQDB (Dual Queue Data Bus) protocols used in high-speed networks for local and metropolitan area networks. Addresses network layer functions of routing and congestion control. Analyzes routing algorithms based on flooding, shortest-path, and optimal routing. Introduces emerging techniques such as ATM (Asynchronous Transfer Mode) for use in the future Broadband ISDN (Integrated Service Data Network). *Prereq. MTH 1384 and ECE 1355.*

ECE 1463 Antennas **4 QH**
Introduces the fundamental principles of antenna theory. Applies these principles to the design and analysis of practical antennas for radar, broadcast, and wireless communication systems. Covers fundamental antenna parameters, radiation integrals and auxiliary potential functions, linear and loop antennas, antenna arrays, broadband dipoles and impedance matching techniques, traveling wave and broadband antennas, and frequency-independent, aperture, and reflector antennas. *Prereq. ECE 1364.*

ECE 1464 Microwave Networks **4 QH**
Focuses on advanced analytical, graphical, and matrix analyses of transmission lines and microwave networks. Covers analyses of lossy and lossless transmission lines, electrical scattering S-parameters, ferrite networks, microwave absorbers, and matrix representation of multiple connected networks. *Prereq. ECE 1364.*

ECE 1466 Modern Optics **4 QH**
Presents the basic optical concepts necessary for an understanding of current and future optical communication, remote sensing, industrial and biomedical systems. Topics include geometric optics, polarized light, diffraction, and interference. Studies lasers and other light sources, optical fibers, detectors, CDD cameras, modulators, and other components of optical systems. Presents applications to specific systems such as medical imaging systems, fiber-optic sensors, laser radars, and communication systems, depending upon the interests of the class. *Prereq. ECE 1364.*

ECE 1471 Elements of Power Systems **4 QH**
Introduces electric power systems. Examines steady-state balanced three-phase systems, transmission line constants and system modeling, transmission line equations and line power limitations, and three-phase transformers. Introduces symmetrical components. *Prereq. ECE 1246 and ECE 1363.*

ECE 1472 Power System Analysis **4 QH**
Presents basic methods for the analysis of power systems, including load flow, symmetrical short circuits, symmetrical component theory and unsymmetrical faults, and elements of power system protection, control, and transient stability. Uses power system software for some system studies. *Prereq. ECE 1471; ECE 1231 must be taken concurrently.*

ECE 1474 Power Electronics **4 QH**
Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and resonant converters. Illustrates modeling, analysis and control techniques on numerous application examples. Covers design problems including analysis and sizing of passive components (inductors and capacitors) in high-frequency DC/DC switching converters. *Prereq. ECE 1332 and ECE 1342.*

ECE 1486 Numerical Methods and Computer Applications **4 QH**
Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; least squares; numerical solution of ordinary and partial differential equations using a programming environment such as MATLAB. Chooses representative problems for solution on a computer. *Prereq. MTH 1225 and GE 1102.*

ECE 1501 Capstone Design 1 **2 QH**
Requires students to select a project requiring design and implementation of an electrical, electronic, and/or software system, form a team to carry out the project, and submit a detailed proposal for the work. *Prereq. ECE 1333, ECE 1342, ECE 1355, ECE 1364, ECE 1382, and senior standing.*

ECE 1502 Capstone Design 2 **4 QH**
Requires students to design and implement the project proposed in ECE 1501. Expects students to evaluate progress with interim milestone reports and to present the final design project with written and oral reports. *Prereq. ECE 1501 taken in previous quarter.*

ECE 1701 Capstone Design 1 (Honors) **2 QH**
Honors equivalent of ECE 1501.

ECE 1702 Capstone Design 2 (Honors) **4 QH**
Honors equivalent of ECE 1502.

ECE 1715 Circuits 1 (Honors) **4 QH**
Honors equivalent of ECE 1215.

ECE 1733 Linear Systems 2 (Honors) **4 QH**
Honors equivalent of ECE 1333.

ECE 1742 Electronics 2 (Honors) **4 QH**
Honors equivalent of ECE 1342.

ECE 1746 Circuits 2 (Honors) **4 QH**
Honors equivalent of ECE 1246.

ECE 1781 Computer Engineering 1 (Honors) **4 QH**
Honors equivalent of ECE 1381.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1001 Introduction to the Study of Engineering **1 QH**
Presents an introduction to the various disciplines of engineering and strategies for success both in the classroom and in practice within the profession.

GE 1002 Introduction to Engineering Cooperative Education **1 QH**
Introduces engineering freshmen students to the cooperative education curriculum and assists them through self-assessment in relation to the engineering profession. Uses the Myers Briggs Type Indicator and Super's Work Values Inventory, to provide students with an introduction to how personalities, work styles, personal values, and interests relate to work performances and career choices. Students examine the engineering profession, develop résumé writing, interviewing, and time-management skills, and are introduced to professional ethics.

GE 1101 Engineering Problem-Solving and Computation **4 QH**
Uses developing and structuring approaches to solve engineering problems. Draws applications from a variety of engineering disciplines, which serve as a tool for introducing students to engineering analysis and design. Includes the design of problem-solving algorithms along with an introduction to the "C" programming language.

GE 1102 Engineering Problem-Solving with Application Software **2 QH**
Develops fundamental problem-solving skills essential to all engineering disciplines. Introduces students to spreadsheet and math application packages and their use in solving engineering problems. Topics include data reduction and transformation, visualization of data and functions, problem structuring, and matrix applications. Examples stress real-life engineering analysis and design as tools for introducing students to the engineering profession.

GE 1103 Engineering Design **4 QH**
Presents the engineering design process using case studies from a variety of engineering disciplines. Topics include problem formulation and specification, creativity, evaluation tools, patents, product liability, ergonomics, systems design, failure analysis, hazard prevention, manufacturing, ethics in engineering, and presentation techniques. Presents engineering graphics, focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Students will develop an original design solution to a technical problem as a term project and use CAD software extensively.

GE 1701 Engineering Problem-Solving and Computation (Honors) **4 QH**
Honors equivalent of GE 1101.

GE 1702 Engineering Problem-Solving with Application Software (Honors) **2 QH**
Honors equivalent of GE 1102.

GE 1703 Engineering Design (Honors) **4 QH**
Honors equivalent of GE 1103.

Mechanical, Industrial, and Manufacturing Engineering

MIM 1212 Engineering Probability and Statistics 1 **4 QH**
Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, moment generating functions, sampling distribution, and point and interval estimations. *Prereq. MTH 1125.*

MIM 1215 Engineering Economy **4 QH**
Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies effects of taxes on investment analysis. Utilizes mathematical and graphical models to evaluate candidate solutions to design alternatives.

MIM 1240 Materials Science **5 QH**
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq. CHM 1132.*

MIM 1241 Materials Science **4 QH**
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. *Non–MIME students.*

MIM 1245 Materials Science **4 QH**
Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors, and junctions. *Non–MIME students. Prereq. CHM 1132.*

MIM 1250 Engineering Mechanics **5 QH**
Examines vector representation of force and moment, equivalent force systems, centroids and centers of gravity, and distributed forces. Examines free-body diagrams and equations of equilibrium, applications to trusses, pin-connected frames and beams, and elementary concepts of friction. Examines fundamentals of dynamics, kinematics of particles, and kinetics of particles using force, mass, and acceleration.

MIM 1270 Thermodynamics **4 QH**
Studies the systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple compressible systems on the ideal gas. Introduces the Second Law of Thermodynamics and the property of entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq. MTH 1223; not open to mechanical/industrial engineering majors.*

MIM 1280 Thermodynamics 1 **5 QH**
Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property of entropy. Emphasizes the macroscopic consequences of irreversibility and the limitation placed, through the Second Law, on the behavior of engineering systems. Available energy and its application in thermodynamics is investigated. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq. MTH 1223 taken concurrently.*

MIM 1300 Measurements and Analysis **5 QH**
Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

MIM 1312 Engineering Probability and Statistics 2 **4 QH**
Examines the definition of a statistic and reviews the distributions and approximations of random variables. Introduces hypothesis testing, including tests for means, variances, and proportion. Covers nonparametric methods, analysis of variance, and simple linear regression.

MIM 1320 Work Design **4 QH**
Covers the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement synthetic standards and work sampling. Includes a project in which principles of work design must be applied.

MIM 1325 Operations Research 1 **4 QH**
Covers deterministic models, including LP and duality; transportation and allocation; sensitivity and postoptimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq. MTH 1223.*

MIM 1354 Strength of Materials **4 QH**
Explores the concept of stress and strain, state of stress and strain at a point, and stress-strain relations and material properties. Investigates moment of inertia of areas and stress properties. Investigates moment of inertia of areas, stress and deformation of simple members under axial and torsional loads, and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Non–ME students.*

MIM 1355 Strength of Materials 1 **5 QH**
Explores the concept of stress and strain, state of stress and strain at a point, and stress-strain relations and material properties. Investigates moment of inertia of areas, stress and deformation of simple members under axial and torsional loads, and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq. MIM 1250.*

MIM 1356 Strength of Materials 2 **4 QH**
Covers asymmetrical bending, analysis of determinate and indeterminate beams by various methods, and buckling of columns. *Prereq. MIM 1355.*

MIM 1360 Dynamics **4 QH**
Development of problem-solving ability in dynamics. Examines kinematics of rigid bodies, including rotating reference frames; kinetics of rigid bodies using force, moment, mass moment of inertia, and acceleration. Examines kinetics of particles and rigid bodies using work and energy, and using impulse and momentum. *Prereq. MIM 1250.*

MIM 1364 Mechanics for Electrical Engineers **4 QH**
Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work, and energy; and impulse and momentum. *Prereq. PHY 1222.*

MIM 1366 Dynamics for Civil Engineers **4 QH**
Covers kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq. CIV 1210.*

MIM 1368 Dynamics 2 **4 QH**
Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq. MIM 1268.*

MIM 1370 Heat Transfer **5 QH**
Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq. ME 1280, MIM 1375, and MTH 1226.*

MIM 1374 Fluid Mechanics **4 QH**
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy), Newton's law of viscosity, dimensional analysis, integral forms of the basic laws (conservation of mass, momentum, and energy), pipe flow analysis, and differential formulation of basic laws with Laminar flow analyses. *Non–ME students.*

MIM 1375 Fluid Mechanics **5 QH**
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with laminar flow analyses. Includes labs and a computer project. *Prereq. MIM 1280 and MTH 1225.*

MIM 1380 Thermodynamics 2 **5 QH**
Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles, including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbocharging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq. MIM 1280.*

MIM 1400 Mechanical Engineering Computation and Interpretation **4 QH**
Studies the application of software tools to the solution of mechanical engineering problems. Techniques for purposes of understanding software, including finite element and finite difference development, are treated as needed. Software for advanced strength analysis, fluid dynamics, and heat transfer problems are included. Interpretation of results is emphasized throughout the course.

MIM 1410 Digital-Simulation Techniques **4 QH**
Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT. *Prereq. Higher-level language and MIM 1312.*

MIM 1420 Computers and Information Systems **4 QH**
Examines the design and implementation of computer-based information systems. Topics include the value of information, tools of system analysis and design, the impact of computer-based information systems on organizations and society, rudimentary computer architecture, input devices, data organization and storage, system configuration, communications, and output/display devices.

MIM 1422 Systems **4 QH**
Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models, transfer functions and block diagrams, system components and the method of analogies, accuracy, and stability. *Prereq. MTH 1230.*

MIM 1425 Operations Research 2 **4 QH**
Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq. MIM 1312.*

MIM 1430 Manufacturing Systems and Techniques **5 QH**
Focuses on manufacturing and design and their impact on each other. Covers the basics of manufacturing systems and techniques. Examines manufacturing and design; manufacturing engineering, planning, and control; and automation in manufacturing. Topics include manufacturing systems, manufacturing processes, rapid prototyping, design for assembly, design for manufacturability, concurrent engineering, CAD/CAM systems, bill of materials, group technology, mechanical tolerancing, quality control, just-in-time philosophy, NC part programming, programmable logic controllers, flexible manufacturing systems, and CIM. Use of a manufacturing lab and related experiments are required for students to gain hands-on experience.

MIM 1440 Mechanical Behavior of Materials **4 QH**
Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq. MIM 1240.*

MIM 1445 Materials Processing **4 QH**
Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq. MIM 1240.*

MIM 1450 Mechanical Design **5 QH**
Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, and simulation; and optimization of mechanical systems. *Prereq. MIM 1356.*

MIM 1455 Mechanical Vibrations **5 QH**
Studies free and forced vibrations of undamped and damped one-degree-of-freedom systems. Includes rotational unbalance, support motion, vibration isolation, vibration measuring equipment, nonviscous damping, general periodic excitation, and nonperiodic excitation using numerical methods. Examines free and forced vibration of multi-degree-of-freedom systems, the vibration absorber, coordinate coupling, and normal modes of vibration. *Prereq. MIM 1360.*

MIM 1475 Thermal Design **5 QH**
Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq. MIM 1370.*

MIM 1480 Thermodynamics 3 **5 QH**
Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts, reacting gas mixtures and combustion, and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change, and normal shock waves. Includes a lab. *Prereq. MIM 1380.*

MIM 1501 Design Project 1 **5 QH**
Applies the engineering sciences to the design of a system, component, or process. Students choose the particular design project with the approval of appropriate faculty. Design teams are organized. Each project includes the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq. MIM 1450 and MIM 1475.*

MIM 1502 Design Project 2 **5 QH**
Continues the project started in MIM 1501. Students remain in the same group and under the direction of the same faculty advisers as in MIM 1501. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq. MIM 1501.*

MIM 1505 Independent Study in Industrial Engineering **4 QH**
Allows independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of the quarter.

MIM 1506 Special Topics **4 QH**
When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq. Permission of the department.*

MIM 1507 Mechanical Engineering Project 1 **4 QH**
Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Senior standing.*

MIM 1508 Mechanical Engineering Project 2 **4 QH**
Continues MIM 1507. *Prereq. MIM 1507.*

MIM 1510 Production and Inventory Control **4 QH**
Explores design of basic inventory models and inventory management systems, single-stage and multistage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses and consideration of job shop scheduling and dispatching problems. *Prereq. MIM 1312 and MIM 1325.*

MIM 1512 Facilities Design **4 QH**
Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computer-assisted layout analysis techniques to problems of real-world scope. *Prereq. MIM 1325.*

MIM 1514 Material Handling System Design **4 QH**
Discusses the design and analysis of large material-handling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and system acquisitions. *Prereq. MIM 1325.*

MIM 1516 Quality Assurance **4 QH**
Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq. MIM 1312.*

MIM 1518 Expert Systems **4 QH**
Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, machine learning techniques, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq. GE 1100, MIM 1212, MIM 1315, or permission of instructor.*

MIM 1520 Human Considerations in Engineering Design **4 QH**
Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue, and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

MIM 1522 Human-Machine Systems **4 QH**
Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

MIM 1528 Design Project **4 QH**
Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq. Senior standing.*

MIM 1530 Manufacturing Automation **4 QH**
Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq. MIM 1315 or permission of instructor.*

MIM 1540 Engineering Materials **4 QH**
Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq. MIM 1240.*

MIM 1550 Advanced Strength and Applied Elasticity **4 QH**
Covers analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq. MIM 1356.*

MIM 1555 System Analysis and Control **4 QH**
Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq. MIM 1360.*

MIM 1560 Computer-Aided Design **4 QH**
Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers principles of numerical control techniques of design and manufacture. Requires a design project. *Prereq. GE 1103 and MIM 1356.*

MIM 1561 Advanced Computer-Aided Design **4 QH**
Covers advanced applications of interactive graphics concepts to different engineering tasks, including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq. MIM 1560.*

MIM 1570 Internal Combustion Engines **4 QH**
Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq. MIM 1380.*

MIM 1575 Fluid Mechanics 2 **4 QH**
Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and the Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq. MIM 1375.*

MIM 1576 Gas Dynamics **4 QH**
Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows, including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq. MIM 1375.*

MIM 1750 Engineering Mechanics (Honors) **5 QH**
Examines vector representation of force and moment, equivalent force systems, centroids and centers of gravity, and distributed forces. Examines free-body diagrams and equations of equilibrium, applications to trusses, pin-connected frames and beams, and elementary concepts of friction. Examines fundamentals of dynamics, kinematics of particles, and kinetics of particles using force, mass, and acceleration. *Prereq. MIM 1250.*

MIM 1755 Strength of Materials 1 (Honors) **5 QH**
Honors equivalent of MIM 1355. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq. MIM 1250.*

MIM 1770 Heat Transfer (Honors) **5 QH**
Honors equivalent of MIM 1370. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq. MIM 1280, MIM 1375, and MTH 1226.*

MIM 1777 Honors Adjunct **1 QH**
To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in MIM 1777 an unlimited number of times, as it can be an adjunct to any mechanical engineering course.

MIM 1780 Thermodynamics 1 (Honors) **5 QH**
Honors equivalent of MIM 1280. The honors section meets as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq. MTH 1223 taken concurrently.*

MIM 1796 Undergraduate Honors Thesis 1 **4 QH**
Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

MIM 1797 Undergraduate Honors Thesis 2 **4 QH**
Continues MIM 1796. *Prereq. MIM 1796.*

Engineering Technology

Computer Technology

CT 1150 Computer Organization 4 QH
Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocesser programming, and input/output processing.

CT 1311 Intermediate C++ Programming 4 QH
Presents C++, which is used to introduce students to Object-Oriented Programming (OOP). Covers functions, arrays, pointers, classes and abstraction, operating overloading, inheritance, virtual functions, polymorphism, and templates. A project is required. *Prereq. GET 1100.*

CT 1330 Data Structures 4 QH
Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq. CT 1311.*

CT 1335 Numerical Methods 4 QH
Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq. CT 1311 and MTH 1195.*

CT 1340 Software Engineering Design 4 QH
Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq. CT 1330.*

CT 1345 Assembly Language 4 QH
Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq. CT 1311 and CT 1150.*

CT 1346 Assembly Language Lab 1 QH
Teaches how to program in 68000 assembly language and presents arithmetics operations, logic operations, and use of input/output functions available in the 68000 as part of a line editor experiment; control of a single-digit hexadecimal display output; use of hardware and software timers to generate a digital clock display; and other experiments that are consistent with the ones described above. *Prereq. CT 1311.*

CT 1348 LISP 4 QH
Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq. CT 1330.*

CT 1351 Advanced Computer Organization 4 QH
Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq. CT 1356 and CT 1375.*

CT 1355 Microprocessor Peripheral Hardware 4 QH
Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq. CT 1374.*

CT 1356 Complex Peripheral Hardware 4 QH
Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq. CT 1355.*

CT 1360 Industry Software 4 QH
Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq. CT 1381.*

CT 1363 Concurrent Programming 4 QH
Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq. CT 1330 and CT 1340.*

CT 1365 Industry Hardware 4 QH
Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq. CT 1356.*

CT 1369 Digital Electronic Design 4 QH
Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq. EET 1311.*

CT 1370 Computer Laboratory 1 **2 QH**
Offers experiments to investigate and test the behavior of basic digital gates and to design and implement simple logic circuits using Boolean theorems. Topics include voltage, current resistance, logic gates, logic functions, gate outputs, fan-in, fan-out, square-wave generation, and operational amplifiers. *Prereq. EET 1311.*

CT 1371 Computer Laboratory 2 **2 QH**
Provides experiments to design and implement building blocks of a computer system. Topics include counters, shift registers, arithmetic and logic units, control units, computer memory, and A/D and D/A converters. *Prereq. CT 1369 and CT 1374.*

CT 1372 Computer Laboratory 3 **2 QH**
Offers experiments that reinforce the concepts of microprocessor interfacing learned during classroom lectures. Topics include input/output ports, displays, interrupts, generating time intervals, interfacing mechanical switches, asynchronous communication, and memory systems. *Prereq. CT 1345 and CT 1374.*

CT 1374 Introduction to CPU Hardware **4 QH**
Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bust concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq. CT 1345 and CT 1368.*

CT 1375 CPU Architecture **4 QH**
Presents high-performance microprocessor architecture and hardware-interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq. CT 1374.*

CT 1377 VLSI Design **4 QH**
Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq. CT 1369.*

CT 1380 Data Communication Methods **4 QH**
Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq. CT 1375.*

CT 1381 Operating Systems **4 QH**
Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq. CT 1330.*

CT 1383 Databases **4 QH**
Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq. CT 1330.*

CT 1387 Bit-Slice Microcomputers **4 QH**
Demonstrates the basic design ground rules common to the bit-slice CPU style of hardware design. *Prereq. CT 1355.*

CT 1389 Single-Chip Microprocessors **4 QH**
Explains the hardware limitations of a single-chip system. When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. *Prereq. CT 1374.*

CT 1390 Special Problems in Computer Technology **4 QH**
Students perform theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

CT 1391 Topics in Computer Technology **4 QH**
Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq. Permission of the instructor.*

CT 1393 UNIX Operating System **4 QH**
Surveys advanced topics related to UNIX and its filing system. Studies the advance features in the editor and system utilities as well as the general theory of an operating system with emphasis on the relationship between the kernal, filing system, and standard libraries. Discusses low-level I/O, forks, pipes, and signaling, and introduces the use of nroff, sed, lint, cc, lex, and yacc. *Prereq. CT 1330.*

CT 1394 Object-Oriented Programming **4 QH**
Examines the methodologies currently used in object-oriented programming languages, drawing on case studies of Small Talk, Flavors, CLOS, and C++. Other topics include G-Base, an object-oriented database system, and the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq. CT 1330.*

CT 1395 Computer Security **4 QH**
Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq. CT 1380.*

CT 1396 PROLOG: An Introduction to Artificial Intelligence **4 QH**
Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq. CT 1330.*

CT 1397 Advanced UNIX Programming **4 QH**
Studies the design and development of C application programs that interface with the UNIX operating system kernel. Enables C programmers to interact with the UNIX operating system through system calls and library routines. Topics include system programming tools, fundamental concepts, file creation and access, signal and signals handling, multitasking, file and terminal I/O, process creation and programming execution, and forms of interprocess communication and synchronization (pipes, message queues,

semaphores, and shared memory). Students use the University's computer facilities to prepare course assignments. *Prereq. CT 1393.*

CT 1480 Local Area Networks 1 **4 QH**
Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq. CT 1380.*

CT 1481 Local Area Networks 2 **4 QH**
Examines the upper four layers of the ISO reference model; transport, session, presentation and application layers. Topics include TCP/IP, DECNET, NETBIOS, FTP, TELNET, and E-MAIL. *Prereq. CT 1480.*

CT 1492 Independent Study in Computer Technology **4 QH**
Independent study of advanced computer technology projects for students usually in the upper junior or senior year having high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq. Permission of adviser and project supervisor.*

Electrical Engineering Technology

EET 1151 Circuit Analysis 1 **4 QH**
Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq. MTH 1193 or PHY 1193.*

EET 1152 Circuit Analysis 2 **4 QH**
Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. *Prereq. EET 1151.*

EET 1310 Electrical Measurements **4 QH**
Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq. EET 1353.*

EET 1311 Digital Electronics 1 **4 QH**
Introduces elements of digital electronics, starting with the binary number system and proceeding to Boolean algebra and DeMorgan's theorems. Discusses combinatorial logic in detail and the basic circuitry to realize AND, OR, and NOT devices. Gives an introduction to sequential logic and the bistable devices required to realize it. Proceeds to the basic sequential circuits such as counters and shift registers. Includes the analysis and design of both combinatorial and sequential circuits. *Prereq. EET 1152.*

EET 1312 Analog Electronics 1 **4 QH**
Reviews the theory of linear circuits and extends it to simple nonlinear circuits of both the two-terminal variety and the three-terminal variety. Considers the solid-state theory of the PN diode as an example of the two-terminal nonlinear device, and the NPN, PNP, and field-effect devices as examples of the three terminal nonlinear elements. Includes light-sensitive and heat-sensitive solid-state devices. Considers the problem of selecting an operating point for a nonlinear device, and the corresponding practical methods of providing the required biases. Introduces the small-signal linear model for the nonlinear device in the vicinity of the operating point. *Prereq. EET 1152, PHY 1193.*

EET 1313 Analog Electronics 2 **4 QH**
Reviews small-signal models for three-terminal devices and discusses frequency response of such models, including the Bode asymptotic approximation to frequency response. Also reviews Mason's signal flow graph concepts for determining transfer functions. Examines operational amplifiers including their ideal behavior and the limitations introduced by finite input and output impedances, finite gain, and finite bandwidth. Explores feedback and stability problems that can occur when using operational amplifiers. Studies applications of feedback to oscillators and active filters. *Prereq. EET 1312.*

EET 1314 Digital Electronics 2 **4 QH**
Reviews the basic concept of Boolean algebra, combinatorial logic, and binary arithmetic, and extends them to the design of coding systems such as binary, binary-coded decimal, Gray code, seven-segment displays, and multiplexers. Introduces flip-flops and sequential logic circuits such as ripple counters, synchronous counters, ring counters and Johnson counters, shift registers, solid-state memory devices, and the 555 timer. Emphasizes design of digital systems using the available microelectronic gates, primarily in the TTL series. *Prereq. EET 1313.*

EET 1315 Digital Electronics 3 **4 QH**
Examines the physical devices that are used to realize digital circuits, as a complement to the previous treatment of idealized mathematical models. Introduces the concepts of rise-time, fall-time, set-up time, hold time, delay time, and the maximum frequency of a clock. Discusses the presently available logic families such as TTL, CMOS, and EC, compares them, and considers the problems of interconnecting them. Introduces memory elements and field-programmable logic elements. Presents interfacing devices such as analog-to-digital and digital-to-analog converters. *Prereq. EET 1314.*

EET 1317 Principles of Communication Systems 1 **4 QH**
Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq. EET 1313.*

EET 1318 Principles of Communication Systems 2 **4 QH**
Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system block and level diagrams, logic control circuits in communication systems, and modems. *Prereq. EET 1317.*

EET 1319 Principles of Communication Systems 3 **4 QH**
Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system

capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq. EET 1318.*

EET 1320 Electricity and Electronics 1 **4 QH**
Introduces circuit analysis, resistive networks, periodic excitation function, steady-state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq. MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.*

EET 1321 Electricity and Electronics 2 **4 QH**
Examines single-stage electronic circuits, magnetic circuits and transformers, electromechanical energy conversion, DC machines, and AC machines. *Prereq. EET 1320.*

EET 1323 Electronic Laboratory **2 QH**
Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field-effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq. EET 1311.*

EET 1324 Circuits Laboratory 1 **2 QH**
Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq. EET 1151.*

EET 1325 Circuits Laboratory 2 **2 QH**
Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 1124.*

EET 1327 Advanced Electronics Laboratory 1 **2 QH**
Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq. EET 1323.*

EET 1328 Advanced Electronics Laboratory 2 **2 QH**
Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 1327.*

EET 1329 Advanced Electronics Laboratory 3 **2 QH**
Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phaselocked loop, as well as a series of microwave experiments and digital experiments. *Prereq. EET 1328.*

EET 1330 Energy Conversion **4 QH**
Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 1152 and MTH 1195.*

EET 1337 Distributed Systems **4 QH**
Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq. MTH 1195 and PHY 1193.*

EET 1353 Circuits Analysis 3 **4 QH**
Introduces three-phase circuits and three-phase, single-phase systems. Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq. EET 1152.*

EET 1354 Circuits Analysis 4 **4 QH**
Explores the Bode asymptotic frequency response approximation and the concept of Mason's signal flow graphs. Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq. EET 1353.*

EET 1360 Engineering Analysis 1 **4 QH**
Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq. EET 1152 and MTH 1195.*

EET 1362 Basic Power Systems 1 **4 QH**
Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq. EET 1354.*

EET 1363 Basic Power Systems 2 **4 QH**
Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq. EET 1362.*

EET 1364 Basic Power Systems 3 **4 QH**
Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq. EET 1363.*

EET 1370 Digital Computers 1 **4 QH**
Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq. EET 1311.*

EET 1371 Digital Computers 2 **4 QH**
Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq. EET 1370.*

EET 1377 Control Engineering 1 4 QH
Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq. EET 1354 and MTH 1195.*

EET 1378 Control Engineering 2 4 QH
Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq. EET 1377.*

EET 1390 Optical Instrumentation 4 QH
Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic non-image-forming systems used for analysis control and metrology. *Prereq. MTH 1192 and PHY 1193.*

EET 1399 Special Problems in Electrical Engineering Technology 4 QH
Offers theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

General Engineering Technology

GET 1001 Critical Thinking 1 QH
Presents strategies for success, in both the classroom and within the profession.

GET 1100 Introductory C++ Programming 4 QH
Introduces computers for problem solving using C++ language. Topics include data types, arithmetic and logical expressions, programming loops, decision making, functions, arrays, and character string manipulation. Offers the use of the University's computer facility to run programs. *Prereq. MTH 1191 or taken concurrently.*

GET 1102 Engineering Technology and Design 4 QH
Introduces the role of the engineering technologist in industry. Topics include engineering problem-solving, engineering design, and analysis of how engineering and technology devices and concepts "work." Introduces technical concepts through practical applications. Includes in-class experiments, group projects, and opportunities to apply verbal and written skills.

GET 1103 Freshman Seminar 1 QH
Introduces students to engineering technology by identifying types of opportunities in each of the technology disciplines. Topics include a discussion of cooperative work assignments and job opportunities available to graduates. Utilizes industry speakers, faculty, and graduates.

GET 1104 Product Design 4 QH
Introduces students to the product realization process used by most successful product companies in industry. Discusses the product development process and organizations, customer needs, product specifications, generation and selection of concepts, and industrial design. Uses industry cases and provides the needed design link from design graphics and CAD to upper-level design courses. *Prereq. GET 1171.*

GET 1105 Computer Applications for Tech 4 QH
Studies the basics of computing in a microprocessor environment (DOS, Windows, MAC, word processing, databases, spreadsheets), with emphasis on applications relevant to technology students. Provides a solid foundation upon which students can develop more extensive computer expertise. Acquired skills are transferable to subsequent courses; cooperative education assignments; and personal and professional endeavors.

GET 1170 Engineering Graphics 1 4 QH
Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2 4 QH
Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq. GET 1170 or equivalent.*

GET 1320 Engineering Ethics 1 1 QH
Uses a case-study approach to examine basic ethical issues likely to confront engineering students on co-op and in their after-graduation professional practice. Attention is given to issues such as licensing, dissent with management, employee responsibilities, trade secrecy versus publication rights, advertising, and product liability. Discusses these issues in the context of the codes of engineering ethics of the engineering societies and general ethical theory. *Prereq. Middler standing or permission of instructor.*

GET 1356 Engineering Economy 4 QH
Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 1191.*

Mechanical Engineering Technology

MET 1301 Mechanics A 4 QH
Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq. MTH 1193, PHY 1191.*

MET 1302 Mechanics B 4 QH
Emphasizes friction, second moments, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq. MET 1301.*

MET 1303 Mechanics C 4 QH
Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq. MET 1302.*

MET 1314 Stress Analysis A **4 QH**
Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, and indeterminate members. Topics include centric loading of bolted and welded connections, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq. MET 1301.*

MET 1315 Stress Analysis B **4 QH**
Discusses beam deflections and reactions by various methods, theorem of three moments and torsional stresses and strains. Topics include pressure vessels, power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq. MET 1314.*

MET 1319 Mechanics **4 QH**
Introduces mechanics to nonmechanical majors. Topics include statics of particles and rigid bodies, and kinematics and kinetics of particles and rigid bodies. *Prereq. MTH 1193 and PHY 1191.*

MET 1330 Mechanical Design A **4 QH**
Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq. MET 1315, MET 1380.*

MET 1331 Mechanical Design B **4 QH**
Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. Emphasizes group design projects. *Prereq. MET 1330.*

MET 1333 Design Laboratory **2 QH**
Provides the opportunity for students to develop group design projects that have been developed as a part of their senior design course (MET 1330 and MET 1331). Projects are completed and presented to their peers and to the faculty. This course must be taken in conjunction with MET 1331. *Prereq. MET 1330.*

MET 1340 Thermodynamics A **4 QH**
Introduces general theory of heat and matter, laws of thermodynamics, energy-transformation principles, availability of energy, properties and processes for pure substances and ideal gases. Topics include thermodynamic properties and processes of liquids and vapors, tables and charts, mixtures of fluids, and vapor cycles. *Prereq. PHY 1192.*

MET 1341 Thermodynamics B **4 QH**
Discusses theory and analysis of actual engine types using gas and internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of gas turbine cycles, steam power cycles, cogeneration systems, and introduction to air-conditioning and refrigeration systems. *Prereq. MET 1340.*

MET 1342 Refrigeration and Air-Conditioning **4 QH**
Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq. MET 1341.*

MET 1343 Heat Transfer **4 QH**
Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and heat exchanger design and selection. *Prereq. MET 1341.*

MET 1373 Fluid Mechanics **4 QH**
Covers the principles of fluid statics and dynamics. Includes topics such as fluid flow in pipes, friction losses, fluid energy, Bernoulli's theorem, flow measurement, open channel flow, pump and fan design, and selection. *Prereq. MET 1032.*

MET 1380 Materials A **4 QH**
Introduces fundamental metallic structures, general metallurgic information covering polymer, ceramic, composite, and properties, testing, and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and selection of materials for engineering applications.

MET 1388 Measurement and Analysis **5 QH**
Examines the theory of mechanical measurements, instruction, and experimentation data and report writing. Applies the principles developed in class to the laboratory, and a detailed technical report is required. Laboratory experiments include such topics as experimental analysis; statistical techniques; and mechanical measurements of temperature, pressure, force, deformation, strain, and rotational frequency. *Prereq. MET 1195, GET 1105, and PHY 1192.*

MET 1391 Mechanical Projects Laboratory **2 QH**
Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep-loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 1315, MET 1380, MET 1390, or taken concurrently.*

MET 1392 Fluids Laboratory **2 QH**
Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, oriface plates, venturii and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq. MET 1370, MET 1390, or taken concurrently.*

MET 1393 Thermodynamics Laboratory **2 QH**
Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq. MET 1341, MET 1390, or taken concurrently.*

MET 1394 Technology Laboratory D **2 QH**
Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective

pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq. MET 1341, MET 1343, MET 1393, or taken concurrently.*

MET 1395 Technology Laboratory E **2 QH**
Offers experiment, analytical, and design projects to examine mechanical engineering concepts. *Prereq. MET 1342, MET 1343, and MET 1390.*

MET 1396 Machine Shop **4 QH**
Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery. *Prereq. MET 1301 and MET 1380.*

MET 1414 Mechanical Vibrations **4 QH**
Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include design of vibration mounts for mechanical equipment, modeling of vibrational systems, shock testing, and computer applications. Laboratory experiments are included. *Prereq. MET 1303.*

MET 1416 Stress Analysis C **4 QH**
Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns' energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings, and an introduction of finite element analysis. *Prereq. MET 1315.*

MET 1444 Power Generation **4 QH**
Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation.

MET 1481 Materials B **4 QH**
Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, composites, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both metals and nonmetals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystalization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq. MET 1380.*

MET 1499 Special Problems in Mechanical Engineering Technology **4 QH**
Theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training **3 QH**
Introduces students to the profession of athletic training, presents the athletic trainer's role in the health-care community, and introduces basic injury prevention and first aid techniques. Serves to educate students about cooperative education, including résumé preparation, job searches, and interview techniques. *Prereq. AT majors or permission of instructor.*

ATP1050 Emergency Care of Athletic Injuries **3 QH**
Teaches recognition and management of medical emergencies, emphasizing those conditions most commonly suffered by athletes. Upon successful completion of this course, the student is awarded American Red Cross certification in CPR and First Aid. *Prereq. ATP 1000 or permission of instructor.*

ATP 1100 Prevention and Care of Athletic Injuries **3 QH**
Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq. ATP 1000.*

ATP 1101 Athletic Training Laboratory **1 QH**
Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills.

ATP 1110 Fundamentals of Athletic Training **3 QH**
Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions.

ATP 1200 Clinical Athletic Training **4 QH**
Introduces students to the manual skills required in the profession. Covers goniometric and anthropometric measurement; splinting, bracing, and taping; assisted ambulation techniques; and protective devices. *Prereq. ATP 1100 and ATP 1101.*

ATP 1250 Evaluation of the Head and Spine **4 QH**
Describes the pathology and management techniques of injuries to the central nervous system and spinal column. Discusses trauma to the head, face, ear, nose, throat, and mouth. *Prereq. ATP 1100.*

ATP 1300 Lower Extremity Evaluation **4 QH**
Focuses on the evaluation and management of orthopedic trauma of the lower extremities. *Prereq. ATP 1200.*

ATP 1350 Upper Extremity Evaluation **4 QH**
Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq. ATP 1100 and ATP 1300.*

ATP 1360 Applied Neuroscience **5 QH**
Covers morphology and functions of the human nervous system. Discusses the normal function and structure of the nervous system and the effects of structural abnormalities on nervous system functions. Includes lecture and laboratory involving handling of human brain tissue. *Prereq. BIO 1152, BIO 1153, BIO 1154, and ATP 1300 or permission of the instructor.*

ATP 1390 Athletic Training Practicum 1 **3 QH**
Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform professional skills under a certified athletic trainer's supervision. *Prereq. ATP 1100 and ATP 1200.*

ATP 1400 Therapeutic Modalities in Athletic Training **4 QH**
Presents the physical agents used in orthopedic therapy. Emphasizes each modality's theoretical and physiological effects on the healing process and presents the indications and contraindications of use. *Prereq. ATP 1300.*

ATP 1410 Disease and Disabilities in Athletes **4 QH**
Provides students with a working knowledge of the pathophysiology and management of common diseases and other medical disorders or disabilities. Discusses rehabilitation techniques, prosthetics, assistive devices, and follow-up care. *Prereq. ATP 1200.*

ATP 1450 Soft-Tissue Massage and Joint Mobilization **4 QH**
Provides students with the theoretical basis and clinical skill to integrate massage and joint mobilization into the rehabilitation plan for patients suffering from musculoskeletal dysfunction. Covers palpation, therapeutic massage techniques, philosophy and physiology of massage, and basic joint-mobilization techniques used for assessment and treatment.

ATP 1490 Athletic Training Practicum 2 **3 QH**
Same as ATP 1390.

ATP 1500 Therapeutic Reconditioning **4 QH**
Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq. ATP 1200 and ATP 1300.*

ATP 1590 Athletic Training Practicum 3 **3 QH**
Same as ATP 1390.

ATP 1600 Organization and Administration of Athletic Training Programs **4 QH**
Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq. ATP 1100, ATP 1200, and ATP 1300.*

ATP 1690 Athletic Training Practicum 4 **3 QH**
Same as ATP 1390.

ATP 1800 Senior Seminar **4 QH**
Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq. Senior standing in the athletic training major.*

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 **1 QH**
Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health-care delivery. Orients students to the department, the college, and the University.

CPS 1112 Cardiopulmonary Sciences Seminar 2 **1 QH**
Reviews the goals, policies, and procedures of the co-op program. Studies the referral process, co-op options, and professional issues within the cardiopulmonary sciences program and the three concentrations within the program (cardiovascular technology, exercise physiology, and respiratory therapy). Gives students the opportunity to learn effective job search strategies through developing résumés, preparing for interviews, identifying work values, and understanding how to make informed choices. Students analyze cases of communication, problem solving, ethical and workplace issues, and learn of appropriate coping mechanisms and resources available to assist them.

CPS 1113 Cardiopulmonary Sciences Seminar 3 **1 QH**
Introduces cardiopulmonary sciences students to the various areas of study within the major. Focuses on medical terminology for health professional majors. Concentrates on everyday word skills used in the medical community. Uses class meetings to introduce and reinforce individual prefixes, root words, suffixes, and their combination.

CPS 1115 Basic Life Support and Cardiac Assessment **2 QH**
Provides cardiopulmonary science students with basic life support (BLS) and cardiac assessment skills. Offers information about 1) coronary artery disease, 2) cardiopulmonary anatomy and physiology, 3) actions for survival, and 4) technical aspects of cardiopulmonary resuscitation (CPR) and foreign body airway obstruction clearance for adults, children, and infants. Includes BLS modules recommended by the American Heart Association (AHA) for health-care providers. A BLS health-care provider card is issued by the AHA to students who successfully complete the course.

Also gives students the opportunity to learn, practice, and demonstrate proper techniques for obtaining heart rates, blood pressure monitoring, and basic EKG procedures. Integrates both lecture and lab sessions. Requires students to participate in one out-of-class session at either the Wellness Office, the Cardiovascular Health and Exercise Clubs, or a Community/Campus Health Fair.

CPS 1116 CPS Seminar **1 QH**
A professional seminar required for transfer students in the Cardiopulmonary Science Department. Substitutes for CPS 1111 and CPS 1112. Focuses on an introduction to the University and the college in the first half of the course. Prepares students for participation in the cooperative education program in the second half.

CPS 1211 Practicum in Respiratory Care **4 QH**
Provides clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq. CPS 1320 and CPS 1321. CPS 1301 and CPS 1332 taken concurrently.*

CPS 1301 Professional Practice Laboratory 1 **1 QH**
Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq. CPS 1211 and CPS 1332 concurrently.*

CPS 1302 Professional Practice Laboratory 2 **1 QH**
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1211, CPS 1301, and CPS 1433 concurrently.*

CPS 1314 Practicum in Respiratory Care 2 **6 QH**
Focuses on treating patients with more complex cardiorespiratory disorders. The second course in a sequence of three directly related to the clinical practice of various modalities of respiratory care. *Prereq. CPS 1211, CPS 1302, CPS 1433, and CPS 1434 concurrently.*

CPS 1315 Practicum in Respiratory Care 3 **6 QH**
Provides clinical experience in hospitals. Emphasizes respiratory care for adult, pediatric, and neonatal critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq. CPS 1314, CPS 1403, CPS 1434 and CPS 1404 and CPS 1576 concurrently.*

CPS 1320 Advanced Cardiopulmonary Physiology **4 QH**
Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Prereq. PAH 1202 and PAH 1204 or equivalent.*

CPS 1321 Cardiopulmonary Disease **4 QH**
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq. CPS 1320, PAH 1202, and PAH 1204 or equivalent.*

CPS 1332 Introduction to Respiratory Care **4 QH**
Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. Basic to all other professional respiratory therapy courses. *Prereq. CPS 1301 and CPS 1321.*

CPS 1403 Professional Practice Laboratory 3 **1 QH**
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1302 and CPS 1434 concurrently.*

CPS 1404 Professional Practice Laboratory 4 **1 QH**
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq. CPS 1403 and CPS 1576 concurrently.*

CPS 1408 Research Design **4 QH**
Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq. Statistics.*

CPS 1414 Clinical Seminar 1 **1 QH**
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq. CPS 1314 concurrently.*

CPS 1415 Clinical Seminar 2 **1 QH**
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq. CPS 1315 concurrently.*

CPS 1433 Respiratory Care for the Medical and Surgical Patient **4 QH**
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq. CPS 1211, CPS 1302, and CPS 1332 concurrently.*

CPS 1434 Respiratory Care for the Critical Patient **4 QH**
Focuses on respiratory-care problems encountered with patients in intensive care units. The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. *Prereq. CPS 1403 and CPS 1433 concurrently.*

CPS 1516 Advanced Clinical Seminar 1 **1 QH**
Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. *Prereq. CPS 1641 concurrently.*

CPS 1517 Advanced Clinical Seminar 2 **1 QH**
Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. *Prereq. CPS 1642 concurrently and CVT status.*

CPS 1518 Advanced Clinical Seminar 3 **1 QH**
Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. *Prereq. CVT senior status.*

CPS 1570 Fundamentals of Perfusion Technology **4 QH**
Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. *Prereq. Perfusion Technology students only.*

CPS 1571 Advanced Life Support Systems 1 **4 QH**
Introduces students to selected techniques of advanced life support applied to the critically ill patient. *Prereq. Senior status in CPS.*

CPS 1572 Perfusion Technology **4 QH**
Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. *Prereq. CPS 1570.*

CPS 1576 Neonatal and Pediatric Respiratory Care **4 QH**
Provides students with an understanding of the methods and techniques of respiratory therapy for neonatal and pediatric patients. Emphasizes mechanical ventilation, newborn care, and the respiratory distress syndrome. *Prereq. RT senior status.*

CPS 1578 Advanced Medical Monitoring **4 QH**
Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. *Prereq. Perfusion Technology students only.*

CPS 1611 Kinesiology **4 QH**
Investigates the science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq. PHY 1201, PHY 1501; PAH 1202 and PAH 1204 or equivalent.*

CPS 1613 Laboratory in Clinical Exercise Testing and Prescription **4 QH**
Presents a didactic and lab experience in assessing cardiopulmonary function, and muscular strength and endurance, as well as body composition, in a variety of clinical syndromes. Gives students the opportunity to prescribe exercise programs for a variety of special clinical populations. *Prereq. CPS 1615 and CPS 1619.*

CPS 1614 Electrocardiography **4 QH**
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq. CPS 1615, PAH 1202, PAH 1204 or equivalent.*

CPS 1615 Exercise Physiology 1 **5 QH**
Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. Includes a laboratory. *Prereq. PAH 1202 and PAH 1204.*

CPS 1616 Exercise Physiology 2 **4 QH**
Studies the role of exercise in health and disease, including acute and chronic effects of exercise upon the cardiovascular, pulmonary, and metabolic systems of individuals with cardiovascular, pulmonary, or metabolic diseases. Specifically explores therapeutic benefits of exercise intervention and rehabilitation for individuals with heart disease, chronic obstructive pulmonary disease, diabetes, obesity, osteo- and rheumatoid arthritis, osteoporosis, and low back pain. *Prereq. CPS 1615.*

CPS 1618 Cardiopulmonary Assessment **5 QH**
Provides students with the opportunity to gain knowledge and understanding of physiological principles and concepts related to clinical cardiopulmonary assessment. Integrates lecture topics with practical laboratory experiences in physical examination techniques, and basic pulmonary function assessment. *Prereq. CPS 1320 and CPS 1321.*

CPS 1619 Exercise Prescription and Programming in Cardiovascular Health **4 QH**
Focuses on skills needed to develop individualized exercise prescriptions for apparently healthy patients. Concentrates on the design, implementation, and evaluation of fitness and wellness programs for individuals and groups in a corporate or commercial setting. *Prereq. CPS 1320 and CPS 1615 concurrently.*

CPS 1622 Clinical Exercise Physiology Practicum 1 **6 QH**
Provides a professional field assignment in a clinical setting designed to help prepare students in their professional career choice. Students will complete a rotation in exercise testing and cardiac rehabilitation. During the course, students assume more patient-care responsibility and develop the skills necessary to function independently. *Prereq. Coursework through Quarter 9 in Exercise Physiology curriculum.*

CPS 1623 Clinical Exercise Physiology Practicum 2 **6 QH**
Offers a professional field assignment in a clinical setting designed to help prepare students in their professional career choice. Students complete a rotation in one of the following: exercise testing, cardiac rehabilitation, pulmonary rehabilitation, diabetic rehabilitation, or nonclinical adult fitness/health promotion. During the course, students assume more patient-care responsibility and develop the skills necessary to function independently. *Prereq. CPS 1622.*

CPS 1624 Clinical Seminar **1 QH**
Prepares clinical exercise physiology students for employment in a variety of settings through the development of case studies, discussion of current internship experiences, and guest lecturers. Presents opportunities for certification, continuing education, and graduate programs for future career and academic choices. *Prereq. Students must be concurrently enrolled in CPS 1623.*

CPS 1625 Administration of Cardiopulmonary Rehabilitation Programs **4 QH**
Studies the administration of clinical cardiac and pulmonary rehabilitation programs. Specifically, the policies and procedures, staffing, and facility requirements necessary to develop and manage a rehabilitation program. Discusses the issues of reimbursement, budget, utilization review, quality assurance, and documentation necessary for cost-effective administration of a rehabilitation program. *Prereq. CPS 1615, CPS 1622, and CPS 1623 concurrently.*

CPS 1632 Health Science Education **4 QH**
Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills. *Prereq. CPS junior status.*

CPS 1641 Fundamentals of Cardiac Catheterization **4 QH**
Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. *Prereq. CPS 1320 and CPS 1321.*

CPS 1642 Advanced Cardiac Catheterization **4 QH**
Covers advanced cardiac catheterization interventional techniques such as coronary angioplasty, stents, and atherectomy. Introduces new technologies such as coronary rotablator and lasers. Includes other techniques such as the intraaortic balloon pump, cardiac pacemakers, and cardiac studies using biopsy, pericardiocentesis, and electrophysiology. *Prereq. Senior year status, CPS 1516, CPS 1641, and CPS 1644 concurrently.*

CPS 1643 Echocardiography **4 QH**
Provides a comprehensive course in adult echocardiography, including an introduction to basic cardiac embryology and cardiac physics. Outlines and discusses M-Mode, 2-D, and color Doppler techniques. Covers transducer positions and echo features of normal versus abnormal echo findings in valvular heart disease, prosthetic heart valves, pericardial disease, and cardiac tumors. *Prereq. Anatomy and Physiology 1 and 2, Pathophysiology, or equivalent.*

CPS 1644 Cardiovascular Technology Internship **6 QH**
Provides cardiovascular technology students with the opportunity to develop, practice, and master skills required to assist with diagnostic and interventional procedures in the cardiac catheterization laboratory. *Prereq. CPS 1642 concurrently.*

CPS 1645 Practicum in Cardiovascular Technology 2 **6 QH**
Provides cardiovascular technology (CVT) students with the clinical opportunity to develop procedural skills for assisting with cardiac catheterization and echocardiography. During the practicum, the student assumes greater CVT responsibility and develops the technical skills necessary to function independently. Emphasizes students' ability to assist the physician, evaluate the patient's clinical status and update the physician, and problem-solve to meet the needs of the patient. *Prereq. CPS 1643 concurrently.*

CPS 1801 Directed Independent Study 1 **2 QH**
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken.

CPS 1802 Directed Independent Study 2 **2 QH**
Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken.

Counseling Psychology, Rehabilitation, and Special Education

CRS 1200 Introduction to Special Education **4 QH**
Surveys the characteristics and the social, emotional, and educational adjustment of individuals with special needs. Reviews legislation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular education settings and also in the community. Introduces principles of instruction and the development of strategies for the generation of Individualized Education Programs (IEPs).

CRS 1314 Introduction to Counseling **4 QH**
Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs **4 QH**
Presents an overview of the etiology and development of disabling conditions and their impacts on infants, children, and youth with special needs. Discusses a variety of biological and environmental risk factors associated with learning problems.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education **4 QH**
Presents the process of assessment, program planning, and implementation for individuals with special needs. Requires students to administer education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation in the context of an Individualized Education Program (IEP).

CRS 1317 Practicum and Seminar in Special Education **8 QH**
Allows for full-time participation in a University-arranged and supervised school program, emphasizing inclusive settings. Gives the student the opportunity to analyze the teaching of and the learning by students with special needs and to demonstrate, evaluate, and develop teaching skills. *Prereq. Advanced professional sequence with minimum 2.5 QPA both overall and in teaching major.*

CRS 1500 Mental Health and Counseling **4 QH**
Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to enhancing emotional health.

CRS 1502 Communicable and Degenerative Diseases **4 QH**
Focuses on the disease immunity process, with emphasis on the mind-body connection. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other communicable and degenerative diseases and disorders.

CRS 1503 Human Sexuality **4 QH**
Examines sexuality from a physical, psychological, social, historical, and cultural perspective. Considers sexual needs and concerns about sexuality at various stages in life.

CRS 1510 Health Counseling **4 QH**
Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health professionals in dealing more effectively with various health issues.

CRS 1800 Directed Study **4 QH**
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

Dental Hygiene

DHY courses are open only to Forsyth Dental Hygiene students unless otherwise indicated.

DHY 1100 Oral Anatomy and Histology **3 QH**
Introduces the student to the structures of the oral cavity. Includes the embryology and histology of the head and neck structures, with primary emphasis on the oral cavity. Studies the formation, eruption patterns, and morphology of the primary and permanent dentitions.

DHY 1101 Dental Hygiene Orientation 1 **2 QH**
Presents an overview of issues relating to the profession of dental hygiene including historical development with emphasis on the philosophy, responsibilities, and current roles of the dental hygienist as a member of the dental health team. Reviews dental terminology. Covers dental manpower and dental delivery systems. *This course is open to non–dental hygiene majors.*

DHY 1102 Dental Hygiene Orientation 2 **2 QH**
Continues DHY 1101. Presents an overview of the dental hygiene process of care to include assessment, diagnosis, planning, implementation, and evaluation. Covers infection control, medical/dental terminology, and principles of four-handed dentistry. Includes a laboratory component. *This course is open to non–dental hygiene majors.*

DHY 1104 Dental Procedures 1 **3 QH**
Introduces the student to the discipline of dentistry. Reviews dental specialties with attention given to the roles and responsibilities of the dental assistant. Places emphasis on exposure control, four-handed dentistry, and use and manipulation of some dental materials. A laboratory component is included. *This course is open to non–dental hygiene majors.*

DHY 1105 Dental Procedures 2 **4 QH**
Continues DHY 1104. Includes a clinical internship in the Harvard School for Dental Medicine postdoctoral training clinics. Students will have an opportunity to apply skills learned in DHY 1104. *Prereq. DHY 1104. This course is open to non–dental hygiene majors.*

DHY 1204 Head and Neck Anatomy **2 QH**
Provides a clinical study of anatomy of the head and neck. Emphasizes deviations from normal anatomy and the diagnosis and management of these deviations as they relate to the patient. *This course is open to non–dental hygiene majors.*

DHY 1209 Periodontology **3 QH**
Builds upon oral anatomy and pre-clinical dental hygiene concepts presented in the fall quarter. Discusses the histopathology, etiology, and clinical features of periodontal infections. Includes current concepts in risk assessment and diagnostics. Emphasizes diagnosis, treatment planning, and clinical management of periodontal patients. Includes a one-hour seminar.

DHY 1211 Dental Hygiene Theory 1 **2 QH**
Encompasses the fundamentals of the science of dental hygiene. Introduces the basic principles and skills utilized to provide oral health care for the patient.

DHY 1212 Dental Hygiene Theory 2 **2 QH**
Provides the student with information necessary for the dental management and treatment of the medically compromised patient. Discusses the etiology, clinical and oral manifestations, treatment planning, and management considerations for the major medical conditions of concern in dentistry. In addition to assigned readings and lecture information, students participate in case method projects to facilitate the clinical application of the course material.

DHY 1214 Dental Hygiene Theory 3 **2 QH**
Discusses the dental hygiene management of patients with special developmental/acquired, medical/physical, sensory and/or psychological needs. Includes topic areas of gerodontics: disabling conditions, major psychiatric diseases, dependency disorders, and the cancer patient. Emphasizes the barriers and access to care, patient management via normalization of care, the use of adaptive aids, preventive techniques, and individualized treatment planning.

DHY 1220 Radiology 1 **2 QH**
Uses lectures, slides, and laboratory experiences to provide the student with a basic knowledge and understanding of radiation biology and hygiene; radiographic image receptors and the developing process; and the fundamentals of dental radiography including the production and projection of X-rays. Emphasizes radiographic surveys by means of the paralleling, bisecting angle, and extraoral techniques.

DHY 1221 Radiology 2 **1 QH**
Continues DHY 1220. Students refine their skills in producing diagnostically acceptable radiographs. Emphasizes interpreting films for projection, exposure, processing errors, normal radiographic anatomy, and common diseases/anomalies of the teeth and bone.

DHY 1228 Dental Materials **3 QH**
Studies the basic composition and properties of dental materials utilized in dental hygiene practice. Emphasizes the selection, manipulation, and clinical management of dental materials. Examines the relationship between the oral environment and dental materials. Laboratory sessions are integrated with lectures to provide the student with the opportunity to practice various techniques such as mixing cements, pit and fissure sealants, polishing of amalgam and composite restorations, impression taking, and study models.

DHY 1240 Nutrition **2 QH**
Introduces the science of human nutrition based upon the principles of biochemistry. Reviews the nature and function of the micro- and macronutrients essential for health with specific emphasis on the role diet and nutrition play in the prevention of diseases and the promotion of optimum health and oral wellness. *This course is open to non–dental hygiene majors.*

DHY 1301 Introduction to Oral Health Research **3 QH**
Introduces the currently accepted theories and methods of oral health research. Studies research methods, experimental design, and statistical methods with emphasis on dental epidemiology and clinical research. Reviews current dental research from dental journals to evaluate the methods, design, validity, and relevancy of the research on the professions of dentistry and dental hygiene. Discusses future research and advances in technology to help the student gain a perspective on needed research. Funding sources will also be reviewed.

DHY 1308 Pathology **4 QH**
Emphasizes oral pathology. Covers normal structures of the oral cavity, principles of general pathology, including inflammation, neoplasia and diseases/conditions of the oral cavity and its environs, with clinical features, some histopathology, the course of the disease(s), and treatment. Stresses common developmental disorders, cysts of the jaws and neck, caries, pulpitis, other dental defects, mucous membrane pathology, viral, bacterial and fungal diseases, white lesions, benign and malignant oral diseases, pigmented dental and mucosal lesions, allergies, and oral manifestations of systemic diseases.

DHY 1315 Dental Hygiene Theory 5 **2 QH**
Introduces dental specialties through lectures, slides, and case presentations of dental procedures related to individual specialties. Topics presented by guest lecturers include orthodontics, endodontics, oral and maxillofacial surgery, prosthodontics, temporomandibular disorders (TMD), dental implants, maxillofacial prosthetics, pediatric dentistry, and radiovisiography.

DHY 1316 Dental Hygiene Theory 6 **2 QH**
Presents material to assist the dental hygiene student to develop the management skills needed to become an effective and productive member of the dental team. Emphasizes identifying professional goals, developing communication skills, writing résumés, perfecting interviewing techniques, and recognizing employer/employee responsibilities and expectations.

DHY 1317 Dental Hygiene Theory 4 **2 QH**
Presents material that focuses on the preventive services of dental hygiene care. Students will consider the role of the dental hygienist relative to caries control, fluoride recommendations, and dietary counseling. Students will integrate concepts of oral wellness and smoking cessation into client care plans as well as examine the delivery of preventive services to clients. Students will also examine chair-side ergonomics for prevention of occupational injuries to themselves.

DHY 1330 Pharmacology **3 QH**
Places initial emphasis on nomenclature to familiarize the student with the terminology used in pharmacology. Undertakes the study of drugs to acquaint the student with their origin, physical and chemical properties, preparation, modes of administration, and effects upon the body systems. Gives special consideration to those drugs that are of dental value, including antiseptics, antibiotics, pain-relieving drugs, and the anesthetics. *This course is open to non–dental hygiene majors.*

DHY 1331 Pain Control **2 QH**
Introduces the dental hygiene student to the recognition and management of pain, fear, and anxiety associated with dental treatment. Lectures will cover basic and current concepts in pain and anxiety control in dental treatment. *Prereq. Current certification in cardiopulmonary resuscitation and DHY 1330.*

DHY 1332 Pain Control Lab **1 QH**
Elective laboratory taken concurrently with DHY 1331. Allows clinical practice of local anesthesia techniques. Additional clinical practice may be required for state licensing and certification and will occur in DHY 1615 and DHY 1616.

DHY 1361 Public Health **2 QH**
Introduces current principles and issues in public health and their relationship to the delivery of oral health care to the public. Investigates and discusses the principles of epidemiology, health care delivery, biostatistics, allied health utilization, and fluoridation. Provides each student with the opportunity to select one issue in public health and explore it by writing a short position paper.

DHY 1362 Community Health **2 QH**
Examines the topics related to community oral health. Explores the principles of program planning and basic health education methods and materials. Provides each student with the opportunity to work with a population in the community and plan, implement, and evaluate a preventive oral health program according to the needs of that population. This experience may help students to recognize a commitment to the community and to accept the responsibilities of a health care professional.

DHY 1364 Seminar in Legal Issues and Ethics **2 QH**
Provides a profile of the dental hygienist within a legal and ethical framework. Examines state practice acts. Students will explore the responsibilities involved in hygienist/patient and employee/employer relationships. Investigates the legal ramifications of a variety of practice settings. Uses case studies and values clarification models to encourage ethical and professional development.

DHY 1401 Oral Health Gerontology **4 QH**
Introduces the dental hygiene student to oral health gerontology. Reviews the biological, psychological, and social aspects of aging. Places an emphasis on oral tissues. Discusses in detail dental hygiene treatment planning and evaluation for both institutional-

ized and community-based elderly patients. Examines public policy and financing of oral health care for the aged. *Prereq. Extramural experience required.*

DHY 1402 Advanced Public Health **4 QH**
Studies the current issues surrounding today's public health-care delivery system in depth. Places emphasis on health legislation, both at the state and federal levels. Issues include access to health care, quality assurance/control, and health-care costs and financing. Includes evaluation of possible solutions in terms of appropriateness, effectiveness, and economy and a review of health-care delivery systems. Students utilize the principles of oral epidemiology through surveys of specified area populations to develop a health promotion plan.

DHY 1403 Dental Seminars **4 QH**
Reviews the current concepts in dentistry and dental hygiene theory and practice. Discusses the impact of new knowledge on the art and science of dentistry, dental hygiene, and prevention of dental disease. Topics are determined by current literature and the political and socioeconomic climate of the times. Uses integration and sharing of personal experiences and practices relating to dental hygiene to assess and improve student's communication, leadership, decision making, and organizational skills.

DHY 1410 Independent Study **4 QH**
Gives students an opportunity to explore in depth a subject relevant to their interests. Provides the opportunity to study a problem, present a proposal, carry out a study or a course of action, and prepare both written and oral presentations of their activities.

DHY 1550 Internship **6 QH**
Provides professional field assignment in a setting designed to enhance students in their professional career development. Includes supervision by faculty, conferences with professional staff, and projects. Internship may be spread over more than one academic quarter. A minimum of 180 hours is required.

DHY 1611, DHY 1612 Clinical Dental Hygiene 1 and 2 **3 QH each**
Provides preclinical and laboratory instruction in the techniques utilized for the complete evaluation and prophylaxis of patients including instrumentation, polishing, patient evaluation procedures, oral physiotherapy, prevention of disease transmission, medical emergencies, and treatment planning. Preclinical activities are coordinated with DHY 1211 and DHY 1212. Actual delivery of patient care begins in DHY 1612. Students are responsible for patient recruitment. A weekly seminar in DHY 1612 is conducted for discussion of medically compromised patient cases and patient-management strategies.

DHY 1613 Clinical Dental Hygiene 3 **3 QH**
Provides dental hygiene and other procedures for both adult and child patients in the Forsyth Clinic. Students are responsible for patient recruitment. A weekly seminar is included for the discussion of patient cases.

DHY 1614, DHY 1615, DHY 1616 **6 QH each**
Clinical Dental Hygiene 4, 5, and 6
Provides clinical experience to the dental hygiene student. Students provide preventive, educational, and therapeutic oral health services as delegated by the Commonwealth of Massachusetts at our dental hygiene clinic to children and adults on an appointment basis. Students are responsible for patient recruitment. In addition to the clinical training at the Forsyth Dental Center dental hygiene clinic, students supplement this training via extramural rotations at area hospitals, community health-care centers, and public health-care programs. A weekly one-hour seminar relates dental hygiene theory to clinical practice.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming **1 QH**
Focuses on basic swimming skills for nonswimmers, with emphasis on personal water safety.

HSL 1101 Intermediate Swimming **1 QH**
Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq. HSL 1100 or equivalent.*

HSL 1106 Beginning Scuba **2 QH**
Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq. HSL 1101 or equivalent.*

HSL 1107 Sailing **1 QH**
Focuses on basic skills in sailing. Taught at Community Boathouse. Lab fee.

HSL 1109 Beginning Gymnastics 1 **1 QH**
Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1114 Badminton **1 QH**
Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis **1 QH**
Focuses on basic tennis strokes, concepts, rules, strategies, and game play.

HSL 1124 Beginning Fencing **1 QH**
Focuses on the fundamental principles and techniques of fencing at the beginner level.

HSL 1131 Yoga **1 QH**
Introduces yoga skills and techniques for men and women at the beginning level.

HSL 1132 Weight Training **1 QH**
Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.

HSL 1133 Physical Conditioning **1 QH**
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.

HSL 1134 Aerobic Exercise and Dance **1 QH**
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.

HSL 1138 Beginning Skiing **1 QH**
Focuses on fundamental techniques of downhill skiing. Lab fee.

HSL 1139 Intermediate Skiing **1 QH**
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. *Prereq. HSL 1138 or equivalent.*

HSL 1140 Basketball **1 QH**
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.

HSL 1142 Volleyball **1 QH**
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.

HSL 1150 Soccer **1 QH**
Focuses on knowledge and skill appropriate to play soccer at the beginning level.

HSL 1153 Modern Dance 1 **1 QH**
Introduces modern dance technique and style.

HSL 1154 Modern Dance 2 **1 QH**
Continues HSL 1153, with progression to more complex modern dance techniques and combinations. *Prereq. HSL 1153 or equivalent.*

HSL 1155 Modern Dance 3 **1 QH**
Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. *Prereq. HSL 1154 or equivalent.*

HSL 1156 Ballet 1 **1 QH**
Introduces ballet fundamentals, with emphasis on alignment.

HSL 1157 Ballet 2 **1 QH**
Continues HSL 1156, with emphasis on developing lyrical style. *Prereq. HSL 1156 or equivalent.*

HSL 1159 Jazz Dance 1 **1 QH**
Introduces the fundamentals of jazz dance, with emphasis on alignment.

HSL 1160 Jazz Dance 2 **1 QH**
Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. *Prereq. HSL 1159 or equivalent.*

HSL 1163 Ballroom Dance **1 QH**
Introduces traditional and contemporary partner dancing.

HSL 1164 Ballroom Dance 2 **1 QH**
Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. *Prereq. HSL 1163.*

HSL 1167 Beginning Racquetball **1 QH**
Focuses on knowledge and skills appropriate to play racquetball at the beginning level.

HSL 1180 Health and Physical Education in the Elementary School **4 QH**
Focuses on introductory knowledge and skills necessary for teaching health and physical education to elementary school children. Emphasizes the importance of the elementary school years for health promotion and positive health behaviors, motor skill development, the implications of health-related fitness, and activities that maximize participation for children in vigorous activity promoting wellness.

HSL 1254 First Aid **2 QH**
Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.

HSL 1270 Health and Motor Development in Early Childhood **4 QH**
Focuses on social, cognitive, and physical aspects influencing health and motor development in preschoolers and across the life span. Emphasizes the importance of the early childhood years for health promotion and positive health behaviors. Studies the development of fundamental motor patterns (walking, running, catching, throwing, striking, climbing, etc.) including perceptual-motor implications. Provides an opportunity to work directly with a preschooler in a laboratory setting observing and assessing fundamental motor patterns and health behaviors.

HSL 1286 Nutrition **4 QH**
Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.

HSL 1325, HSL 1326, HSL 1327 **1 QH each**
Dance Rehearsal and Performance 1, 2, 3
Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq. Permission of instructor.*

HSL 1511 Independent Study 1 **1 QH**

HSL 1512 Independent Study 2 **2 QH**

HSL 1513 Independent Study 3 **3 QH**

HSL 1514 Independent Study 4 **4 QH**
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.

HSL 1599 Theory of Coaching **4 QH**
Provides students with the opportunity to study and analyze learning principles, leadership skills, sociology, and psychology as applied to coaching teams and individuals. Focuses primarily on athletes of junior and senior high school age.

HSL 1600 Psychology of Sport **2 QH**
Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq. Physical education major or permission of instructor.*

HSL 1601 Sociology of Sport **2 QH**
Studies sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.

HSL 1777 Honors Adjunct **1 QH**
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouvé. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.

Medical Laboratory Science

MLS 1101 Medical Laboratory Science Orientation 1 **1 QH**
Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.

MLS 1102 Medical Laboratory Science Orientation 2 **1 QH**
Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.

MLS 1104 Laboratory Techniques **3 QH**
Covers the principles and theories of basic technical skills needed to work competently in a clinical or research laboratory. Discusses issues concerning laboratory safety, aseptic technique, OSHA regulations, quality control, quality assurance, solution preparation, and method evaluation and applies them in a laboratory component. *Prereq. CHM 1122, or concurrently.*

MLS 1109 Foundations of Clinical Laboratory Science **4 QH**
Examines basic lab methods employed in primary care, including urinalysis, Gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq. Admission to physician assistant program or permission of instructor.*

MLS 1112 Renal Physiology and Urinalysis **2 QH**
Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. *Prereq. BIO 1109 and CHM 1111.*

MLS 1125 Hematology **4 QH**
Examines basic hematology procedures and principles. Emphasizes hematopoiesis, hematologic cell maturation, normal and abnormal cell morphology, basic hemostasis, and coagulation testing. *Prereq. BIO 1109, CHM 1122, MLS 1104, or permission of instructor.*

MLS 1132 Immunohematology **3 QH**
Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. *Prereq. BIO 1109, BIO 1172, or permission of instructor.*

MLS 1145 Microbiology **4 QH**
Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. *Prereq. BIO 1109, CHM 1122, and MLS 1172.*

MLS 1152 Clinical Chemistry and Instrumentation **4 QH**
Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. *Prereq. CHM 1122, MLS 1104, and MLS 1112.*

MLS 1172 Immunology **2 QH**
Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and nonspecific host response. Covers common laboratory methods for the detection of antigens and antibodies. *Prereq. BIO 1109 and CHM 1122.*

MLS 1212 Urinalysis Laboratory **1 QH**
Laboratory for MLS 1112.

MLS 1225 Hematology Laboratory **1 QH**
Laboratory for MLS 1125.

MLS 1232 Immunohematology Laboratory **1 QH**
Laboratory for MLS 1132.

MLS 1245 Microbiology Laboratory **1 QH**
Laboratory for MLS 1145.

MLS 1252 Clinical Chemistry and Instrumentation Laboratory **1 QH**
Laboratory for MLS 1152.

MLS 1412 MLT Special Topics—Applied Microscopy **2 QH**
Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT (NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1423 MLT Applied Study in Hematology **2 QH**
Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1432 MLT Applied Study in Blood Banking **2 QH**
Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1442 MLT Applied Study in Clinical Microbiology **2 QH**
Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)- level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1452 MLT Applied Study in Clinical Chemistry **2 QH**
Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)- level instruction. *Prereq. Admission to MLT Clinical Program.*

MLS 1480 MLT Seminar 1 **2 QH**
Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. *Prereq. Admission to MLT Clinical Program.*

MLS 1523 Hematology MT Applied Study **4 QH**
Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1533 Immunohematology MT Applied Study **4 QH**
Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1544 Clinical Microbiology MT Applied Study **7 QH**
Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1552 Clinical Chemistry MT Applied Study **7 QH**
Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1573 Clinical Immunology MT Applied Study 1 **1 QH**
Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. *Prereq. Admission to MT Clinical Program.*

MLS 1574 Clinical Immunology MT Applied Study 2 **1 QH**
Continues MLS 1573.

MLS 1601 Foundations of Forensic Laboratory Science **4 QH**
Introduces students to the basis for genetic and chemical analysis of forensic evidence. Presents basic scientific information about the technologies on which DNA testing and identification of drugs of abuse are based. Provides students with the basic understanding of how these specific scientific technologies are used in forensic investigations, how the evidence is collected, and how the scientific results are used in court to provide information to those who are charged with determining guilt or innocence. Uses specific case studies to illustrate certain points.

MLS 1621 Advanced Hematology 1 **3 QH**
Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they relate to normal, anemic, and leukemic conditions. *Prereq. MLS 1125 or permission of instructor.*

MLS 1623 Special Topics: Hemostasis **1 QH**
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq. MLS 1125 or permission of instructor.*

MLS 1631 Advanced Immunohematology **2 QH**
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq. MLS 1132.*

MLS 1648 Advanced Clinical Microbiology **4 QH**
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. *Prereq. MLS 1145 and MLS 1245.*

MLS 1649 Medical Parasitology and Mycology **3 QH**
Discusses the parasites and fungi that are pathogenic to man, including pathogenesis, relevant clinical symptoms, and diagnostic criteria. Emphasizes the laboratory procedure used in their diagnosis and organism characteristics used for identification. *Prereq. BIO 1109, MLS 1145, and MLS 1245.*

MLS 1656 Advanced Clinical Chemistry **4 QH**
Discusses advanced principles of clinical chemistry and some instrumentation, as well as acquisition, management, and application of laboratory data. Studies methods of quantitating clinically significant analytes, including pathophysiology of related disease states. *Prereq. BIO 1109, CHM 1265, and MLS 1152.*

MLS 1661 Medical Laboratory Science Education **2 QH**
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq. Concurrent with Quarter 8 of MLS program.*

MLS 1662 Clinimetrics **2 QH**
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq. Permission of instructor.*

MLS 1665 Medical Laboratory Management **2 QH**
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq. Concurrent with MT clinical applied study.*

MLS 1672 Immunopathology **3 QH**
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq. MLS 1172.*

MLS 1680 MLS Special Topics **2 QH**
Discusses current topics in the clinical lab. *Prereq. Permission of instructor.*

MLS 1681 MLS Senior Seminar **2 QH**
Reviews current undergraduate medical lab science topics.

MLS 1890 Undergraduate Research **2 QH**
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq. Permission of instructor.*

MLS 1891 MLS Current Concepts **1 QH**
Discusses topics determined by recent advances in medical lab science.

Nursing

NUR 1102 Introduction to Human Nutrition 4 QH
Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Uses principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice.

NUR 1107 Nursing Process and Skills 3 QH
Emphasizes the centrality of critical thinking to clinical reasoning. Introduces the nursing process as a problem-solving tool and its application in assessing strategies of communication, gathering data, interpreting evidence, analyzing viewpoints, and forming judgments. Provides scientific principles as the framework for using basic nursing skills in the practice of selected nursing interventions. Includes practicing skills in a clinical laboratory. *Prereq. NUR 1110 and MTH 1101 or taken concurrently.*

NUR 1110 Nursing Health Assessment 4 QH
Emphasizes dimensions of collecting data relevant to health status. Provides an opportunity for learning to use tools and skills of health assessment. Discusses ethnic, cultural, spiritual, social, psychological, developmental, and gender and physical aspects of health assessment. Explores formulating nursing diagnosis and examining the relationship of the nursing care plan to overall resources of the client. Includes practicing skills in a clinical laboratory.

NUR 1202 Pathophysiological Concepts for Clinical Nursing 4 QH
Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological functions, endocrine functions, and skin integrity. Explores how the human body uses its adaptive powers to maintain equilibrium and how alterations affect normal processes. Examines disease processes and implications for nursing practice. *Prereq. BIO 1164 or equivalent.*

NUR 1206 Promoting Healthy Childbearing and Childrearing 8 QH
Emphasizes the promotion of health from conception to adolescence. Describes potential and actual health-risk factors and explores risk-reduction strategies within the context of the individual, family, and community. Uses the nursing process to provide the framework for students to assess and intervene therapeutically in promoting healthy childbearing and childrearing. Examines the concepts of human development of individual, family, and community within the context of the role of the professional nurse in promoting healthy childbearing and childrearing. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1164, BIO 1654, CHM 1107, COP 1370, ENG 1110, ENG 1111, PSY 1111, NUR 1102, NUR 1107, and NUR 1110.*

NUR 1208 Promoting Healthy Adulthood and Aging 8 QH
Emphasizes the promotion of health in adults and includes common health problems of adults at critical life stages from the young adult to the frail, elderly years. Analyzes potential and actual health-risk factors and the discovery of risk-reduction strategies by applying the nursing process to the care of adults living within families and communities. Enables students to use health education and teaching methods in assessing and intervening therapeutically to meet the primary health-care needs of adults. Assesses the role of the nurse in partnership with the family and community in disease prevention. Includes clinical learning experiences in a variety of settings. *Prereq. BIO 1122, BIO 1622, and NUR 1206.*

NUR 1282 Wellness 4 QH
Focuses on experiential exploration of the concept of wellness. Examines behaviors and lifestyle choices that lead to a high level of physical, emotional, and spiritual well-being. Includes issues of assessment of health risk, behavior change, lifestyle analysis, and the life cycle and stress management through self-analysis. *Open to any undergraduate student.*

NUR 1304 Independent Study Elective 2 QH
Allows students to pursue a topic more intensely or with a special focus. Enables students to contract with a faculty member whose background, interests, and time allow direction of in-depth study. Requires student and faculty member jointly develop course objectives. *Prereq. Permission of academic adviser.*

NUR 1306 Promoting Health Restoration in Children 10 QH
Focuses on the therapeutic nursing interventions used to restore health to children who are experiencing acute and/or complex health problems. Analyzes complex health issues within the context of the individual, family, and community. Examines altered family patterns of coping within a developmental framework and describes support to meet the unique health needs of the family and child. Addresses the therapeutic role in partnership with the family and resources available within a collaborative and interdisciplinary environment. Discusses ethical and legal dimensions of caring for children and their families. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1202, NUR 1206, NUR 1208, NUR 1308, PCL 1306; and PCL 1307 concurrently.*

NUR 1307 Influences of Health and Illness 4 QH
Enables the student to understand the values that underlie health-seeking behavior and providing care. Uses values clarification to appreciate individual rights and responsibilities versus the common good. Examines cultural differences in light of individual and group behavior as well as life span issues and family and group responsibilities. Builds a caring ethic and a sense of professional responsibility on the basis of self-awareness and self-examination.

NUR 1308 Promoting Health Restoration in Adults 10 QH
Focuses on the therapeutic nursing interventions used to restore health to adults who are experiencing acute and/or complex health problems. Analyzes deviations from health with attention to the implications for the individual, as well as the family, in coping with health problems. Analyzes the client's health-care needs and the resources to meet them, in collaboration with the client and health providers. Discusses ethical and legal dimensions of nursing care of adults. Emphasizes discharge planning and teaching. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1202, NUR 1206, NUR 1208, PCL 1306; and PCL 1307 concurrently.*

NUR 1310 Health-Care Informatics **4 QH**
Provides a broad overview of information management and its use in health-care delivery to students in nursing and the health sciences. Examines the use of computerized information systems and their application to clinical practice, administration, education, and research. Analyzes telecommunication approaches and resources for nursing and health care. Explores current and emerging technologies used in the delivery of health care, with an emphasis on their impact on health-care delivery and patient outcomes. Addresses confidentiality/security and legal/ethical issues related to the use, design, and management of computerized health-care information systems. *Prereq. Basic computer knowledge.*

NUR 1406 Promoting Healthy Communities **7 QH**
Focuses on developing, implementing, and evaluating therapeutic interventions for the community as the client. Uses the nursing process, within the community context, informed by epidemiological trends, sociocultural characteristics, political and legislative influences, organizational programs, environmental factors, and consumer inputs. Emphasizes the role of the public-health nurse in multiple arenas of practice. Examines epidemiological principles and public-health policies in relation to identified health problems and conditions in a specific community. Enables students to conduct a comprehensive assessment, in partnership with the community, to develop a program to meet an identified community health need. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1306, NUR 1308.*

NUR 1408 Promoting Mental Health Restoration **7 QH**
Focuses on developing, implementing, and evaluating psychotherapeutic interventions for clients with complex mental health problems. Analyzes alterations in psychobiological and psychosocial functioning and coping. Formulates a plan of care within the context of the client as individual, family, group, and community. Emphasizes the therapeutic use of the self as students develop communication and other helping skills in interpersonal relationships with clients. Provides the opportunity to apply theories, principles, and research findings in providing mental health care for clients in various settings. Fosters collaboration with the client and interdisciplinary team. Discusses the political, legal, and ethical issues related to the delivery of mental-health services and the creative role of the nurse. Includes clinical learning experiences in a variety of settings. *Prereq. NUR 1306, NUR 1308.*

NUR 1502 Introduction to Research in Nursing **4 QH**
Builds on students' prior exposure to selected studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health-care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq. Concurrent SOC 1320 or equivalent.*

NUR 1507 Comprehensive Nursing Practicum **6 QH**
Helps students to synthesize nursing knowledge, skills, and experience and facilitate their transition to professional nursing practice and case management of clients with complex health problems. Enables students to demonstrate leadership and collaborative skills in working with other members of the health-care team. Examines professional, role, and career issues in weekly seminars. Includes clinical learning experiences in a variety of settings. *Prereq. Senior standing or concurrent NUR 1406, NUR 1408, and NUR 1508.*

NUR 1508 Managing and Leading in Nursing **6 QH**
Focuses on the knowledge and skills related to the delivery of health services within a nursing management context. Presents theories, concepts, and models, such as managed care, organization and management, authority, delegation, resource allocation, budgeting, leadership and empowerment, change, motivation, environmental safety, quality improvement, collective bargaining, and conflict resolution, to give the student an understanding of the knowledge base for the management role of the baccalaureate nurse. Provides the opportunity to apply principles and practice skills in planning and delegating nursing care using different organizational models and approaches. Discusses the developing creative role for managing and leading in nursing. Includes clinical learning experiences in a variety of settings. *Prereq. Senior standing or concurrent NUR 1406 and NUR 1408.*

Pharmacy

PAH 1101 Health Career Seminar **1 QH**
Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation.

PAH 1135 Professional Dynamics in the Health-Care Delivery System **4 QH**
Examines the evolution of the American health-care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1 **5 QH**
Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq. CHM 1122 or BIO 1142, and BIO 1109.*

PAH 1204 Anatomy-Physiology 2 **5 QH**
Covers structure and function of the various life-supportive systems not covered in the first quarter. Includes survey of human anatomy and physiology using experiments, specimens, and computer simulation. Oriented to students in the health professions. Lab fee. *Prereq. PAH 1202 or permission of instructor.*

PAH 1210 Anatomy-Physiology 1 **4 QH**
Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq. MLS majors or permission of instructor.*

PAH 1211 Anatomy-Physiology Laboratory 1 **1 QH**
Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq. Permission of instructor.*

PAH 1212 Anatomy-Physiology 2 **4 QH**
Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq. Permission of instructor.*

PAH 1213 Anatomy-Physiology Laboratory 2 **1 QH**
Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq. Permission of instructor.*

PAH 1280 Biochemistry **5 QH**
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq. BIO 1109 and CHM 1269.*

PAH 1405 Alternative Medicine **4 QH**
Presents an objective discussion of the alternative medical methods. Emphasizes theory of alternative methods, principles of treatment, and the effects of alternative methods. Discusses the complete theory of homeopathy and Chinese medicine and the possible physiological and biochemical explanations of the beneficial effects of alternative methods.

PAH 1776 Junior/Senior Honors Thesis **4 QH**
Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq. Honors participation.*

PAH 1777 Honors Adjunct **1 QH**
Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (1 NI) or PAH honors adviser. *Prereq. Honors participation and permission of instructor.*

PCL 1305 Pharmacodynamics 1 **3 QH**
Introduces pharmacologic principles, with the individual pharmaceuticals of drug groups and individual pharmaceuticals of particular importance in the diagnosis and treatment of disease. Focuses primarily on the applications of such principles and agents to the nursing profession. *Prereq. BIO 1120, BIO 1164, CHM 1105, and CHM 1106.*

PCL 1307 Pharmacodynamics 2 **2 QH**
Continues the topics introduced in PCL 1305. *Prereq. PCL 1305.*

PCL 1409 Pharmacology for the Respiratory-Care Practitioner **4 QH**
Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner. *CPS students only or permission of instructor. Prereq. PAH 1202 and PAH 1204.*

PCL 1420 Pharmacology/Medicinal Chemistry 2 **6 QH**
Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq. PMC 1419 and middler standing.*

PCL 1422 Pharmacology/Medicinal Chemistry 3 **6 QH**
Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autacoids, and antineoplastics. *Prereq. PCL 1420 and junior standing.*

PCL 1453 Experimental Design in Pharmacology **1 QH**
Examines the scientific process through which new drugs are discovered, with emphasis on critical assessment of experimental variability. Compares and contrasts laboratory studies in reductionist systems with clinical trials in human patients. Provides students with the opportunity to learn how to locate, evaluate, and explain technical information pertinent to pharmacy through individual library research projects, student discussions, and a term paper. *Prereq. PMC 1419 and middler standing.*

PCL 1801, PCL 1802, PCL 1803 **4 QH each**
Special Research Project (Pharmacology)
Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor and program director.*

PCT 1240 Pharmaceutical Calculations **4 QH**
Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceutics and for improving problem-solving skills using computers. *Prereq. BIO 1109, CHM 1122, and MTH 1108.*

PCT 1300 Dosage Forms **4 QH**
Focuses on the formulation and administration of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Formerly PCT 1350 Pharmaceutics 2. Prereq. MTH 1108, PHY 1203, CHM 1269, PAH 1280, and PCT 1240 or concurrent enrollment and middler standing.*

PCT 1320 Dosage Forms Laboratory **2 QH**
Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. Lab fee. *Formerly Pharmaceutics Laboratory 2. Prereq. PCT 1240 and PCT 1300 or concurrent enrollment and middler standing.*

PCT 1340 Physical Pharmacy **4 QH**
Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, coarse dispersion, diffusion and membrane transport, and chemical kinetics. *Formerly Pharmaceutics 1. Prereq. PCT 1300, PCT 1320, and middler standing.*

PCT 1370 Pharmaceutics Laboratory **2 QH**
A combined lab course incorporating dosage forms preparation and physical pharmacy analysis. Provides students with the opportunity to learn to apply the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. Teaches students to apply physiochemical principles to analysis for quality control and biopharmaceutics and pharmacokinetics exhibited. *Prereq. PCT 1240, PCT 1300, and PCT 1340 concurrently.*

PCT 1440 Biopharmaceutics/Pharmacokinetics **4 QH**
Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses the general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq. MTH 1108, PAH 1204, PAH 1280, PCT 1240, PCT 1300, PCT 1320, PCT 1340, PCT 1360, and junior standing.*

PCT 1801, PCT 1802, PCT 1803 **4 QH each**
Pharmaceutics Special Research Project
Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor(s) and program director.*

PHP 1102 The Profession of Pharmacy **2 QH**
Introduces pharmacy freshman students to the profession of pharmacy. Discusses pharmacist roles in health-care delivery, pharmacy demographics, drug component of health care, pharmacy education, pharmacy law, ethics and professionalism, and professional pharmacy associations.

PHP 1300 Pharmacotherapeutics for Physical Therapy Practice **2 QH**
Covers the effects and side effects that are encountered by the physical therapy practitioner. *Prereq. CHM 1105 and 1106, CPS 1615, PTH 1001, PTH 1203, PTH 1252 and PTH 1253, PTH 1316, PTH 1325, PTH 1352, and PSY 1111 and PSY 1112.*

PHP 1301 Pharmaceutical Jurisprudence **4 QH**
Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq. Junior standing.*

PHP 1302 Pharmacy Administration 1 **4 QH**
Covers contemporary administrative aspects of pharmacy: trends in contemporary practice, third-party payment plans, macroeconomic impact on the profession, and the impact of current health-care issues on pharmacy. *Prereq. Senior standing or permission of instructor.*

PHP 1303 Interpersonal Skills for Health Professionals **4 QH**
Applies the skills of interpersonal communication to situations encountered in various health-care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audiovisual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings. *Prereq. Pharmacy and dental hygiene majors only.*

PHP 1314 Pharmacy Care Management **4 QH**
Focuses on the managerial and administrative skills required by a contemporary pharmacist practicing in either a community or hospital setting. Discusses classical management principles of planning, decision making, organizing, hiring, and controlling. Covers aspects of managing pharmacy business growth such as marketing, market research, advertising, pricing, reimbursement, resource utilization, and inventory control. Uses a case-study method throughout as an interactive teaching tool. Incorporates in lectures and case materials current events in pharmacy, future characteristics of pharmacy practice, national health care, quality assurance, and risk management. *Prereq. Senior standing or permission of instructor.*

PHP 1401 Drug Information and Evaluation **3 QH**
Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems, how to respond to drug information questions, and basic statistical data required to help understand, interpret and evaluate the medical and pharmaceutical literature. *Prereq. Junior standing or permission of instructor.*

PHP 1402 Parapharmaceuticals **2 QH**
Focuses on the nature and application of various surgical devices, appliances, bandages, home health-care products, and hospital

and sickroom supplies, and on monitoring equipment in the provision of pharmacy care. *Prereq. Senior standing.*

PHP 1411 Pathophysiology **4 QH**
Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq. PAH 1202, PAH 1204 or concurrent enrollment, and middler standing.*

PHP 1441 Therapeutic Drug Monitoring **4 QH**
Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq. PCT 1440 and junior standing.*

PHP 1501 Ambulatory Pharmacy Externship **4 QH**
Involves a 400-hour (10 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq. PHP 1301, PHP 1601, and PHP 1609.*

PHP 1503 Professional Practice Laboratory **1 QH**
Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of therapy. *Prereq. PHP 1301, PHP 1601, and PHP 1609.*

PHP 1505 Hospital Pharmacy Externship **4 QH**
Provides students with the learning experience needed to develop competency in the delivery of pharmacy services within a hospital setting. The student receives information and hands-on experience in all phases of inpatient and outpatient dispensing; monitoring drug utilization; hospital committee activities; utilizing hospital reference material; and hospital managerial skills and procedures. *Prereq. PHP 1609 and senior standing. Taken at the same time as PHP 1506.*

PHP 1506 Clinical Pharmacy Clerkship **8 QH**
Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq. PHP 1609 and senior standing.*

PHP 1601 Nonprescription Medication **4 QH**
Provides an overview of the types of over-the-counter (OTC) medications. Discusses correct use precautions and adverse effects in a variety of patient populations. Addresses the issue of counseling different types of patients. *Prereq. Junior standing.*

PHP 1603 Selected Topics in Clinical Pharmacy 1 **4 QH**
Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq. Permission of instructor.*

PHP 1604 Selected Topics in Clinical Pharmacy 2 **4 QH**
Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy

PHP 1605 Introduction to Sterile Products **4 QH**
Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq. Junior or senior pharmacy majors only or permission of instructor.*

PHP 1607 Cancer Chemotherapeutics **4 QH**
Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq. Fourth-year pharmacy major or permission of instructor.*

PHP 1609 Pharmacotherapeutics **6 QH**
Examines the drug therapies of the major disease states. Covers selected cardiovascular, respiratory, hepatic, renal, and endocrine disorders. *Prereq. PCL 1420, PCL 1422, PCT 1440, PHP 1411, PMC 1419, PMC 1421, and junior standing.*

PHP 1612 Special Topics in Pharmacy Administration **2 QH**
Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq. Junior or senior pharmacy majors only.*

PHP 1614 Special Topics in Pharmacy Administration **4 QH**
Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq. Junior or senior pharmacy majors only.*

PHP 1615 Clinical Immunology **3 QH**
Reviews the fundamentals of basic immunology, including humoral and cell-mediated immunity, the major histocompatibility complex (MHC), and cytokines, then progresses to in-depth discussion of immunological diseases and disorders, including hypersensitivity, infectious disease, congenital and acquired immunodeficiencies including AIDS, cancer immunology, transplantation, and autoimmunity. Discusses various important immunotherapeutic modalities, including monoclonal antibodies, cytokines, and recombinant DNA technology products. *Prereq. PharmD student or permission of instructor.*

PHP 1801, PHP 1802, PHP 1803, PHP 1804 **4 QH each**
Special Research Project
Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq. Permission of instructor.*

PHP 1805 Special Research Project **3 QH**
Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq. Permission of instructor.*

PHP 1806 Special Research Project **2 QH**
Same as PHP 1805.

PMC 1322 Pharmaceutical Biotechnology **3 QH**
Introduces the principles of immunology and molecular biology and discusses their applications to the design, development, and use of biopharmaceuticals and to gene insertion therapies. Topics include small and large peptides, antibodies, and growth factors. *Prereq. PAH 1202 (or concurrent enrollment), PAH 1280, CHM 1269.*

PMC 1419 Medicinal Chemistry/Pharmacology 1 **5 QH**
Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, antipsychotics, and opioid analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq. BIO 1109, CHM 1269, PAH 1202, PAH 1204 (or concurrent enrollment), PAH 1280, and middler standing.*

PMC 1421 Antiinfectives **5 QH**
Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq. BIO 1121, PAH 1280, PMC 1419, and junior standing.*

PMC 1801, PMC 1802, PMC 1803 **4 QH each**
Special Research Project (Medicinal Chemistry)
Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq. Permission of instructor and program director.*

PMD 1100 Introduction to the Profession of Pharmacy **2 QH**
Introduces pharmacy freshman students to the profession of pharmacy. Discusses pharmacist roles in health-care delivery, pharmacy demographics, drug component of health care, pharmacy education, pharmacy law, ethics and professionalism, and professional pharmacy associations. *Prereq. First year of the Pharm.D. curriculum.*

PMD 1102 Introduction to Pharmacy Practice **1 QH**
Serves as an introduction to the technical knowledge and skills required in both community and institutional pharmacy practice. *Prereq. First year of the Pharm.D. curriculum.*

PMD 1300 Biochemistry **5 QH**
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109, and CHM 1269.*

PMD 1301 Health-Care Systems **4 QH**
Examines the evolution of the American health-care delivery system from the early forms of organized institutional health care through the dynamic, and increasingly integrated and managed-care system of the present health-care industry. Examines the interaction of regulatory, economic, political, and social aspects with particular emphasis on pharmacy practice. Discusses current proposals for health reform and various state initiatives as well as international examples. Considers the impact and consequence of actions in one era on the structure and function of health care in later years. *Prereq. Third year of the Pharm.D curriculum or permission of instructor.*

PMD 1302 Communications Skills for Pharmacists **4 QH**
Introduces practical communications skills used in pharmacy practice settings, focusing on group discussion, interpersonal communication, medication counseling, and public speaking. Practices and critiques language, listening, nonverbal communication, self-monitoring, group problem-solving, and presentation skills. Students are expected to participate in a group discussion, write a paper on interpersonal communication, conduct a patient counseling session, and present a speech using rhetorical techniques and visual aids to explain clearly a technical process or concept. *Prereq. Third year of the Pharm.D. curriculum.*

PMD 1303 Human Physiology 1 **4 QH**
Provides students with an understanding of the principles of physiology. Discusses physiological information mostly related to cell physiology, muscle physiology, and physiology of the nervous system. Focuses on the physiological mechanisms of the major organ systems. Physiological information will be related to the specific areas of pharmacology. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109.*

PMD 1304 Human Anatomy **1 QH**
Provides students with the knowledge of anatomy in a laboratory setting. Focuses on anatomical structures of the major organ systems. Emphasizes structure-functional relationship. Study of gross anatomy is aided by computer programs and by microscopy of the available histology slides. Physiological information is related to the specific areas of anatomy. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109.*

PMD 1310 Immunology **4 QH**
Presents and discusses the fundamentals of basic immunology, including the properties of the immune response, the cells and tissues involved in the immune system, major histocompatibility complex, T-cell activation, B-cell activation and antibody structure, cytokines, complement, immune response regulation, as well as selected immunological disease states and potential immunotherapeutic options. Consists of lectures and a weekly session in which primary literature is discussed and analyzed, and patient cases may be discussed. *Prereq. Third year of the Pharm.D. curriculum, PMD 1300.*

PMD 1311 Pathophysiology 1 **4 QH**
Examines the mechanisms of human disease, emphasizing fundamental principles of cellular biology. Dedicates early sessions to understanding normal cell biology, cell vulnerabilities, and cellular responses to injury. Discusses systemic responses to injury including inflammation, immunity, and hemostasis. A detailed discussion of oncogenesis is followed by a system-by-system review of disease states. *Prereq. Third year of the Pharm.D. curriculum, PMD 1300, and PMD 1303.*

PMD 1312 Human Physiology 2 **4 QH**
Provides students with an understanding of the principles of physiology. Discusses physiological information mostly related to cardiovascular, respiratory, digestive, urinary, and endocrine systems. Focuses on the physiological mechanisms of the major organ systems. Physiological information is related to the specific areas of pharmacology. *Prereq. Third year of the Pharm.D. curriculum, BIO 1109, PMD 1303, PMD 1304.*

PMD 1313 Human Physiology Laboratory **1 QH**
Focuses on physiology of the major organ systems. Students actively participate in discussions concerning physiological functions of the organ systems. Interactive CD-ROMs allow each student to study in-depth the functioning of each organ system. Structure-functional relationship is stressed where physiological information is related to the specific areas of pharmacology. *Prereq. Third year of the Pharm.D. curriculum, PMD 1303, PMD 1304, and PMD 1312 (concurrent).*

PMD 1320 Medical Microbiology and Antimicrobials **5 QH**
Reviews the structure and physiology of bacteria, fungi, parasites, and viruses, and then surveys the members of each of these groups of organisms that commonly colonize and/or cause significant disease in humans. The survey focuses on human organ systems such as skin and mucous membranes, gastrointestinal, respiratory, and urinary tracts, central nervous system, blood and lymphatics, and others. As the students develop knowledge of microorganisms that cause disease of each of these organ systems, the chemistry of available antimicrobial therapeutic agents is introduced, and this information integrated with a reminder of the relevant microbial target enzyme or physiological process. When possible, demonstration cultures of microorganisms are made available to students, and computer study guides or kodachrome slide sets are available for review. *Prereq. Third year of the Pharm.D. curriculum, PMD 1300 and PMD 1310.*

PMD 1321 Pathophysiology 2 **4 QH**
Builds on the principles begun in PMD 1311 and examines the mechanisms of human disease, emphasizing fundamental principles of cellular biology. Involves a system-by-system review of the disease state, including renal disease, fluid and electrolyte disorders, gastrointestinal, neurological, and musculoskeletal diseases. *Prereq. Third year of the Pharm.D. curriculum, PMD 1311, and PMD 1303.*

PMD 1322 Pharmaceutical Calculations **2 QH**
Students investigate the application of mathematical concepts in pharmacy. Emphasizes improving problem-solving skills, learning systems of measurement, and performing basic arithmetic calculations as they relate to the practice of pharmacy. Computer-aided instruction is available. *This course is a module, intended to be taken in conjunction with PMD 1323. Prereq. Third year of the Pharm.D. curriculum, MTH 1108, CHM 1269, and PMD 1300.*

PMD 1323 Dosage Forms **4 QH**
Focuses on the formulation and administration of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Prereq. Third year of the Pharm.D. curriculum, MTH 1108, PHY 1203, CHM 1269, and PMD 1300.*

PMD 1324 Pharmacy Care 1 **1 QH**
Provides an opportunity for students to reflect upon their co-op experience and share their experiences with faculty and their peers. Focuses on improving the communication skills of the student. Students are expected to complete a written paper, an oral presentation, and a listening assignment. Students gain an understanding of the various co-op opportunities that are available to them from discussions with their peers. Students also gain an understanding of many workplace issues that they may encounter during their co-op periods of study. *Prereq. Middler year co-op.*

PMD 1400 Physical Pharmacy **4 QH**
Focuses on the study of physiochemical theories and principles and their application to pharmaceutical systems. Covers thermodynamics, ionic equilibria, solubility, complexation, interfacial phenomena, rheology, course dispersion, diffusion and membrane transport, and chemical kinetics. *Prereq. Satisfactory completion of entry-level PharmD curriculum through quarter 11.*

PMD 1401 Pharmaceutics Laboratory **2 QH**
A combined lab course incorporating dosage forms preparation and physical pharmacy analysis. Students learn to apply the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. Students also learn to apply physiochemical principles of analysis to quality control and biopharmaceutics and pharmacokinetics exhibited. *Prereq. Satisfactory completion of entry-level PharmD curriculum through quarter 11.*

PMD 1402 Pharmacology 1 **4 QH**
Introduces the principles and basic concepts of pharmacology and the general mechanisms of drug action, including drug-receptor interactions. Discusses the major drug classes affecting the peripheral autonomic and central nervous systems, including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and antimanic agents. Considers therapeutic uses, mechanisms of drug action, undesirable actions, including side effects and adverse reactions. *Prereq. Satisfactory completion of entry-level PharmD curriculum through quarter 11.*

PMD 1404 Research Methods and Biostatistics **4 QH**
Covers aspects of experimental design and hypothesis testing. Uses critical reading of clinical trials, observational studies, and problem sets to illustrate principles of research design, conduct, and analysis. Students are required to complete a research protocol. *Prereq. Satisfactory completion of PharmD curriculum through quarter 11.*

PMD 1410 Pharmacokinetics and Biopharmaceutics **4 QH**
Focuses on the basic principles and methods of biopharmaceutics and pharmacokinetics. Covers the kinetics of drug absorption, distribution, metabolism and excretion: linear and nonlinear pharmacokinetics; general concept of one- and two-compartment models with instantaneous (e.g., IV bolus) or zero-order (e.g., IV infusion) or first-order (e.g., oral administration or IM injection) input; evaluation of bioavailability and investigation of the factors affecting drug availability; influence of the route of administration and the dosage form and regimen on bioavailability; bioequivalence study; multiple dosing kinetics; general approaches to dosage adjustment in renal disease; and noncompartmental analysis. *Prereq. Satisfactory completion of PharmD curriculum through quarter 13.*

PMD 1411 Drug Information and Evaluation **4 QH**
Allows students to develop the skills necessary to become effective providers of drug information. An effective provider assesses and evaluates drug information needs and evaluates, communicates, and applies data from the published literature and other sources to optimize patient care. These skills are developed through three main areas: didactic instruction, drug information question presentations, and one drug information paper. *Prereq. Satisfactory completion of PharmD curriculum through quarter 13.*

PMD 1412 Nonprescription Medication **4 QH**
Provides an overview of the types of over-the-counter (OTC) medications. Discusses correct use, precautions, and adverse effects in a variety of patient populations. Addresses the issue of counseling different types of patients. *Prereq. Satisfactory completion of entry-level PharmD curriculum through quarter 13.*

PMD 1413 Pharmacology 2 **4 QH**
Continues discussion of topics introduced in Pharmacology 1 (PMD 1402). Deals primarily with major drug classes affecting the central nervous system (narcotics, drugs of abuse), cardiovascular and renal systems, local anesthetics, autocoids, and nonsteroidal anti-inflamatory drugs. *Prereq. Satisfactory completion of PharmD curriculum through quarter 13.*

PMD 1414 Pharmacy Seminar 2 **1 QH**
Focuses on career exploration and decision making. The student completes the Glaxo/Wellcome Pathway Evaluation Program. This program introduces students to the many career opportunities available to them in pharmacy and facilitates a decision-making process by which students may make more informed career choice decisions. Students also attend presentations from different pharmacy professionals and have an opportunity to ask questions and explore different practice areas of pharmacy. The course allows students an opportunity to reflect upon their co-op experience and to share their experiences with faculty and peers. Students complete a written paper and give a brief oral presentation. Oral presentations are conducted in small groups with co-op faculty and pharmacy faculty facilitators. This course meets ACE objectives of developing skills related to effective thinking, communication, information literacy, and interpersonal skills. *Prereq. MCOP 1010.*

PMD 1420 Integrated Sciences 1 **7 QH**
The Integrated Sciences series (PMD 1420, PMD 1550, and PMD 1554) are didactic courses on advances in pathophysiology, pharmacotherapeutics, and application of scientific and clinical literature to patient care. The major emphasis of these courses is placed on 1) the medical management of disease states most frequently encountered in practice; 2) considerations and precautions that are required in the proper selection and dosing of drugs most frequently used in these disease states; and 3) the recognition of clinically significant efficacious and/or toxic drug effects. This first course focuses on the problem-oriented medical record (medical problems are presented in a subjective, objective, assessment, and plan [SOAP] format), interpretation and clinical significance of frequently encountered laboratory tests, adverse drug reactions, and the medical management of neurologic, psychiatric, substance abuse, and pulmonary disorders. *Prereq. Satisfactory completion of PharmD curriculum through quarter 14.*

PMD 1422 Therapeutic Drug Monitoring and Applications **4 QH**
Covers the monitoring, developing, and modifying of drug dosage regimens; the use of pharmacokinetic factors influencing the regimen selection for therapeutic drug categories; the applications of test performance characteristics in interpreting drug-serum concentrations; and the applications of these principles and concepts to the monitoring of drug therapy in humans. *Prereq. Satisfactory completion of PharmD curriculum through quarter 14.*

PMD 1424 Pharmacology 3 **5 QH**
Continues discussion of topics introduced in Pharmacology 1 and 2 (PMD 1402 and PMD 1413). Deals primarily with major drug classes, ineluding antiinfective and antineoplastic agents and drugs affecting the gastrointestinal, endocrine, reproductive, and hematopoietic systems. *Prereq. Satisfactory completion of the PharmD curriculum through quarter 14.*

PMD 1501 Advanced Pathophysiology/Pharmacotherapeutics 1 **5 QH**
Examines the pathophysiology of major disease states as it relates to the development of a patient-oriented pharmacotherapeutic plan. Emphasizes the role of pathophysiology, etiology, clinical signs and symptoms, and diagnosis in the selection, initiation, and monitoring of therapeutic drug regimens. Allows students to develop skills in case evaluation by the application of lecture material to patient-specific cases through weekly seminars. Covers cardiology, nephrology, and hepatology. *Prereq. PharmD tracking students.*

PMD 1502 Advanced Pathophysiology/Pharmacotherapeutics 2 **5 QH**
Continues discussions introduced in PMD 1501. Covers infectious disease (module 1), pulmonary, neurological, nutritional, and gastrointestinal diseases. *Prereq. PMD 1501.*

PMD 1503 Advanced Pathophysiology/Pharmacotherapeutics 3 **5 QH**
Continues discussions introduced in PMD 1501 and PMD 1502. Covers infectious disease (module 2), AIDS, pediatrics and neonatology, and obstetrics and gynecology. *Prereq. PMD 1502.*

PMD 1511 Pharmacy Research and Evaluation **3 QH**
Covers aspects of experimental design and hypothesis testing. Uses critical reading of clinical trials, cohort and retrospective studies, and health services research articles to illustrate principles of research design and conduct. Students are expected to complete a research protocol. *Prereq. PharmD tracking students.*

PMD 1512 Biometrics **2 QH**
Explores the fundamental principles of experimental design and statistical analysis, emphasizing biomedical research. Topics include probability distributions, descriptive statistics, hypothesis testing, correlation, regression, and chi-square testing. *Prereq. PharmD tracking students.*

PMD 1515 Pharmacoeconomics **3 QH**
Applies various pharmacoeconomic techniques to an analysis of drug therapy and other pharmacy-related issues. Examines the role of quality of life and therapeutic outcomes in pharmacoeconomic studies. Investigates the value of pharmacoeconomic studies. *Prereq. PharmD tracking students.*

PMD 1600 Institutional Experience **4 QH**
Provides experiential rotation in a contemporary institutional setting where students have the opportunity to further develop knowledge of and demonstrate pharmacy practice skills. Focuses on delivery of patient-oriented care, management and evaluation of pharmacy operations and medication distribution systems, and provision of additional professional services. *Prereq. PMD 1503 and sixth-year PharmD tracking student status.*

PMD 1601, PMD 1602, PMD 1603, PMD 1604 Clinical Clerkship 1,2,3,4 **9 QH each**
Provides experiential rotations in specialty areas of contemporary pharmacy practice where students can apply knowledge to delivery of patient care. Offers students the opportunity to demonstrate skills in areas of communication, critical thinking and problem-solving, and patient-oriented care through observation and performance. *Prereq. PMD 1503 and sixth-year PharmD tracking student status.*

Physical Therapy

PTH 1001 Basic Physical Therapy Procedures **4 QH**
Offers a basic practical understanding of patient care procedures used in physical therapy practice, including body mechanics, therapeutic positioning, patient ambulation and transfer techniques, and range-of-motion exercises. Introduces physical therapy students to cooperative education and its implications for career planning in physical therapy. Covers self-assessment, résumé writing, and interviewing skills.

PTH 1118 Developmental Basis of Human Performance **4 QH**
Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes. *Prereq. PTH 1001, PTH 1252, PTH 1253, and PTH 1316.*

PTH 1203 Therapeutic Modalities in Physical Therapy Practice **4 QH**
Prepares students to apply therapeutic modalities in a variety of diagnoses. Includes theory, demonstration, and application of thermal, electrical, hydro-, and light therapies. *Prereq. BIO 1162, BIO 1163, CPS 1615, PHY 1202, PTH 1001, and PTH 1252.*

PTH 1252 Clinical Gross Anatomy 1 **3 QH**
Covers the structure and function of the head, neck, and trunk regions of the human body, with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems, and clinical application to these systems. *Prereq. BIO 1162, BIO 1163, and BIO 1164.*

PTH 1253 Clinical Gross Anatomy 2 **3 QH**
Covers the structure and function of the extremities of the human body, with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems and clinical application to these systems. *Prereq. BIO 1162–BIO 1164, BIO 1652–BIO 1154, PHY 1201, PHY 1501, and PTH 1252.*

PTH 1310 Clinical Gross Anatomy **6 QH**
Covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver prosection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq. BIO 1152, BIO 1153, and BIO 1154. AT students only.*

PTH 1316 Neuromuscular Physiology **4 QH**
Covers fundamental physiologic principles that underlie somatosensation and motor control, with applications to physical therapy practice. *Prereq. BIO 1162, BIO 1163, BIO 1164, CHM 1105, CPS 1615, PTH 1252, and PTH 1253.*

PTH 1320 Soft-Tissue Mobilization **2 QH**
Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq. BIO 1162, BIO 1163, CPS 1615, PTH 1202, PTH 1252.*

PTH 1325 Clinical Medicine 1 **4 QH**
Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq. BIO 1162, BIO 1163, and BIO 1164.*

PTH 1330 Clinical Kinesiology **5 QH**
Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq. PTH 1252, PTH 1253, and PTH 1316.*

PTH 1340 Pathokinesiology **4 QH**
Examines orthotic and prosthetic strategies for managing pathological movement. Topics include: pathomechanics of the lower extremity and trunk, introduction to orthotic and prosthetic management, components of lower extremity orthotic and prosthetic appliances, principles of alignment and fit, appliance checkout procedures, and training programs. Requires students to perform clinical gait analyses, prescribe orthotic and prosthetic appliances to address specific movement problems, and develop treatment programs that progress hypothetical patients from initial evaluations to discharge. *Prereq. CPS 1615, PHY 1201, PHY 1202, PTH 1118, PTH 1202, PTH 1252, PTH 1253, and PTH 1330.*

PTH 1345 Orthopedic Clinical Medicine 2 **3 QH**
Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1325.*

PTH 1352 Psychosocial Aspects of Illness **3 QH**
Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1363 Neurological Evaluation and Treatment 1 **5 QH**
Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1330.*

PTH 1364 Neurological Evaluation and Treatment 2 **5 QH**
Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders. *Prereq. PTH 1252, PTH 1253, PTH 1316, and PTH 1330.*

PTH 1366 Neuroanatomy **5 QH**
Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq. PTH 1252 and PTH 1253.*

PTH 1371 Clinical Seminar **1 QH**
Discusses selected topics related to clinical education including professional and ethical issues, interpersonal relationships, OSHA regulations, medical-legal issues, and the affiliation placement process. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1380 Supervised Clinical Education 1 **5 QH**
Provides students with opportunities to practice evaluation and treatment of patients under the supervision of licensed clinicians. Students may be assigned to clinics outside of Massachusetts. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy **4 QH**
Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardiopulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders, and physical therapy management. *Prereq. Physical therapy students who have satisfactorily completed all prior professional courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.*

PTH 1392 Pathophysiology and Clinical Therapeutics **1 QH**
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1396 Pediatric Evaluation/Treatment **2 QH**
Explores evaluating and treating the motor aspects of the neuromuscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1400 Administration **4 QH**
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq. PTH 1380.*

PTH 1405 Research for Physical Therapy **4 QH**
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq. COM 1105, ENG 1125, ENG 1350 or ENG 1380, and MTH 1106 or MTH 1107.*

PTH 1411 Clinical Integration **4 QH**
Uses case study format to integrate all previously learned physical therapy skills. Students use current research to rationalize treatment plans chosen for case presentation. *Prereq. All previous PTH courses except Application 1.*

PTH 1415 Supervised Clinical Education 2 **0 QH**
Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1416 Supervised Clinical Education 3 **0 QH**
Continues PTH 1415. Provides an additional clinical assignment that gives students the opportunity to further refine their clinical skills under the supervision of a qualified physical therapist. Students may be assigned to clinics located outside of Massachusetts. *Prereq. Satisfactory completion of all prior professional courses.*

PTH 1420 Physical Therapy in the Health-Care System **3 QH**
Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health-care team. Involves class discussion and seminar. *Prereq. PTH 1370 and PTH 1380.*

PTH 1426 Functional Aspects of Aging **3 QH**
Discusses the interaction of psychological, social, and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq. PTH 1370 and PTH 1380.*

PTH 1430 Physical Therapy for the Pediatric Client **5 QH**
Covers the evaluation, assessment, and comprehensive management of movement dysfunction related to common pediatric conditions and diseases. Explores the impact of illness and disability on the child and family. *Prereq. PTH 1001, PTH 1118, PTH 1203, PTH 1252, PTH 1253, PTH 1316, PTH 1320, PTH 1325, PTH 1330, PTH 1340, PTH 1345, PTH 1352, PTH 1363, PTH 1366, PTH 1391, PTH 1440, and PTH 1441.*

PTH 1440 Musculoskeletal Evaluation and Treatment 1 **5 QH**
Provides an opportunity to develop knowledge and skills in evaluating upper-quarter dysfunction. Uses a problem-solving approach. *Prereq. CPS 1615, PTH 1001, PTH 1203, PTH 1252, PTH 1253, PTH 1316, PTH 1320, PTH 1325, PTH 1330, PTH 1340, PTH 1345, and PTH 1392.*

PTH 1441 Musculoskeletal Evaluation and Treatment 2 **5 QH**
Provides an opportunity to develop knowledge and skills in evaluating lower-quarter dysfunction. Uses a problem-solving approach. *Prereq. PTH 1118, PTH 1391, and PTH 1440.*

PTH 1453 Advanced Musculoskeletal Assessment and Treatment **3 QH**
Provides an opportunity to develop knowledge and skills in evaluating and treating spinal dysfunction. Uses a problem-solving approach. *Prereq. PTH 1391, PTH 1392, and PTH 1396.*

PTH 1602 Special Topics in Physical Therapy **2 QH**
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy **4 QH**
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct **1 QH**
Constitutes an addition to any three, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study **2 QH**
Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq. Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing **4 QH**
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Hearing Science **4 QH**
Presents basic concepts related to the physics of sound and an in-depth study of the anatomy and physiology of the normal hearing mechanism. Discusses basic principles of psychophysics of audition.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms **4 QH**
Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq. SLA 1101.*

SLA 1300 Language Acquisition **4 QH**
Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq. SLA 1101.*

SLA 1301 Phonetics **4 QH**
Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition. *Prereq. SLA 1101 and SLA 1201.*

SLA 1303 Introduction to Audiology **4 QH**
Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 1400 Speech Science **4 QH**
Offers an examination of the basic sciences involved in speech and audition. Includes an in-depth study of the analysis of sound and the acoustic composition of speech. Emphasizes review of current theory and research in speech reception, perception, and production.

SLA 1403 Clinical Procedures in Speech and Language **4 QH**
Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1405 Seminar in Speech-Language Pathology and Audiology **4 QH**
Focuses on advanced theoretical and clinical topics in speech-language pathology and audiology as they relate to issues associated with enrollment in an externship. Students are expected to present case studies and participate in problem-based learning situations as a means of facilitating critical thinking and problem-solving associated with clinical management. Presents various topical issues ranging from changes in the health-care environment to awareness and appreciation of cultural factors.

SLA 1410 Speech Pathology 1 **4 QH**
Presents models of developmental speech, language, and communication impairments. Includes such topics as specific language impairments, articulation/phonological disorders, dysfluency, and language-based learning problems. Stresses common clinical processes associated with the management of these and other disorders. *Prereq. SLA 1101, SLA 1201, SLA 1300, and SLA 1301.*

SLA 1411 Speech Pathology 2 **4 QH**
Focuses on organic and acquired speech, language, and communication disorders. Emphasizes clinical problem-solving for disorders such as voice, craniofacial anomalies, aphasia and related neurogenic disorders, and cerebral palsy. *Prereq. Speech Pathology 1 and associated prerequisites.*

SLA 1460 Neurological Bases of Communication **4 QH**
Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study **4 QH**
Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

Toxicology

TOX 1100 Toxicology Orientation **1 QH**
Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxins in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology **1 QH**
Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology **4 QH**
Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq. PMC 1418.*

TOX 1301 Fundamental Principles of Systemic Toxicology **4 QH**
Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq. PMC 1418.*

TOX 1302 Chemical and Analytical Toxicology **4 QH**
Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq. PMC 1418 and TOX 1301.*

TOX 1322 Biochemical Toxicology Laboratory **4 QH**
Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq. TOX 1300, TOX 1301, or TOX 1302.*

TOX 1811, TOX 1812, TOX 1813 Toxicology Research **4 QH each**
Students participate in faculty-directed research projects in the toxicology laboratory.

ROTC, Military Officers' Training Program

AIR 1110 Foundations of the U.S. Air Force 1 **1 QH**
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.

AIR 1111 Leadership Laboratory 1 **1 QH**
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.

AIR 1120 Foundations of the U.S. Air Force 2 **1 QH**
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.

AIR 1121 Leadership Laboratory 2 **1 QH**
Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.

AIR 1210 Evolution of U.S. Air Force Air and Space Power 1 **1 QH**
Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914–1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.

AIR 1211 Leadership Laboratory 3 **1 QH**
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.

AIR 1220 Evolution of U.S. Air Force Air and Space Power 2 **1 QH**
Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Emphasizes experiences from the Vietnam conflict and Operations Desert Shield and Desert Storm. Continues emphasis upon student participation and presentations to enhance communicative skills.

AIR 1221 Leadership Laboratory 4 **1 QH**
Continues AIR 1211. Adds a special program in preparation for field training.

AIR 1310 U.S. Air Force Leadership Studies 1 **4 QH**
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.

AIR 1311 Leadership Laboratory 7 **1 QH**
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.

AIR 1320 U.S. Air Force Leadership Studies 2 **4 QH**
Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment. Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.

AIR 1321 Leadership Laboratory 8 **1 QH**
Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.

AIR 1410 National Security Affairs 1 **4 QH**
Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process. Emphasizes developing communication skills through student presentations.

AIR 1411 Leadership Laboratory 5 **1 QH**
Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.

AIR 1420 National Security Affairs 2 **4 QH**
Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communication skills through student presentations.

AIR 1421 Leadership Laboratory 6 **1 QH**
Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.

ARM 1101 Introduction to the U.S. Army **1.5 QH**
Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style, physical fitness training, and drill and ceremonies.

ARM 1102 Basic Leadership **1.5 QH**
Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.

ARM 1103 Basic Tactics **1.5 QH**
Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.

ARM 1202 Contemporary Army Operations **1.5 QH**
Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard components. Uses these concepts as building blocks to analyze and discuss United States Army doctrine and tactics. Integrates other world forces into the course structure through the study and examination of ongoing military operations as well as current events inside and outside the military.

ARM 1203 Health and Physical Fitness **1.5 QH**
Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1204 Map Reading **1.5 QH**
Provides students with an introduction to map reading. Subjects range from being able to locate and explain marginal information to identifying topographical symbols on a military map. Addresses plot-and-measure azimuths; identifying five major terrain features; identifying five colors on a military map; using resection and intersection; and navigating using a map and compass.

ARM 1206 Great Battles of Military History **1.5 QH**
Analyzes some of the great battles in military history. Methods of analysis include investigation of military theory and doctrine, generalship, strategy, tactics, logistic administration, technology, and the sociopolitical-economic factors that resulted in the battles' outcomes.

ARM 1300 Leadership Laboratory **0 QH**
Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation **2 QH**
Presents advanced land navigation techniques to junior-year ROTC cadets. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance, and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training **2 QH**
Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic **2 QH**
Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare cadets for maximum individual performance at the six-week ROTC advanced camp (ARM 1305). Required for all cadets attending advanced summer camp at Fort Lewis, Washington. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5 **6 QH**
Provides external leadership lab conducted at Fort Lewis, Washington, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 270 colleges and universities from across the nation. All expenses borne by the United States government, including a stipend of approximately five hundred dollars. *Prereq. ARM 1302 and ARM 1303.*

ARM 1400 Leadership Laboratory 4 **0 QH**
Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills **2 QH**
Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies, group processes, and oral and written presentations. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics **2 QH**
Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics **2 QH**
Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory **0 QH**
Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC nursing students.

NAV 1101 Introduction to Naval Science **3 QH**
Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1202 Seapower and Maritime Affairs **3 QH**
Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Russian naval strengths.

NAV 1401 Leadership and Management 1 **3 QH**
Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2 **3 QH**
Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to confidently assume the responsibilities of a commissioned officer in the United States Navy. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer, with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.

School of General Studies

ECN 4601 Economics 1 **4 QH**
Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

ED 4003 Integrated Language Skills A **4 QH**
Strives to improve reading and related study and language skills. Emphasizes reading skills such as vocabulary, comprehension, interpretation, and critical reading, as well as study skills such as previewing, finding main ideas and details, outlining, summarizing, classifying information, and locating signal words. Focuses on strengthening study habits, time management, basic computer skills, memory and listening techniques, note-taking and exam-taking strategies. Examines the correlation between reading and writing within the course and across the disciplines. Assignments from both fiction and nonfiction address the primary theme of the course, forming an identity.

ED 4004 Integrated Language Skills B **4 QH**
Continues to strengthen reading and study skills. Explores techniques for researching, organizing, and writing term papers using critical reading and thinking skills as they relate to the learning process. Helps students develop insight into their strengths and interests regarding a choice of major and career. Reading and research assignments emphasize the primary theme of the course, developing a social conscience.

ED 4005 Integrated Language Skills Seminar **1 QH**
Integrates critical reading, thinking, and study skills with other courses in order to provide support for students with differing abilities. Uses literature, films, discussion, and related assignments to explore and develop themes relating to world events. Assists students in preparing the necessary documents and information to obtain sophomore status and a co-op assignment.

ENG 4013 Introductory Writing 1 **4 QH**
Introduces students to the components of the writing process: generating and developing ideas, organizing and structuring essays, considering audience, drafting and revision, and controlling the conventions of standard edited written English. Provides students with the opportunity to learn to read short texts of some complexity (which in turn serve as the occasion for their own writing) and to write expository prose that makes use of a variety of rhetorical strategies and research methods. *Prereq. SGS students only.*

ENG 4014 Introductory Writing 2 **4 QH**
Continues ENG 4013. *Prereq. ENG 4013; for SGS students only.*

HST 4110 History of Civilization A **4 QH**
Covers the major ideas and institutions of civilization from ancient times to 1648.

HST 4111 History of Civilization B **4 QH**
Continues HST 4110, covering the period since 1648. *Prereq. HST 4110.*

MGT 4110 Survey of Business and Management **4 QH**
Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organizations, and the functions of management in the context of their influence on the various forms of business. Lecture and class discussion give the student an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

MTH 4000 Mathematical Preliminaries 1 **4 QH**
Reviews precollege mathematics, primarily arithmetic and elementary algebra. Covers operations with numbers, fractions, decimals, percents, exponents, signed numbers, simple equations, and polynomials, together with applications of these skills and concepts. The sequel to this course is MTH 4010.

MTH 4010 Mathematical Preliminaries 2 **4 QH**
Surveys algebra, including exponents, multiplication of polynomials, factoring, linear equations, quadratic equations, graphing, linear systems with two variables together with applications. A TI-83 graphing calculator is required. For students whose background in algebra is weak.

MTH 4020 Functions and Algebra **4 QH**
Examines how to solve and graph various kinds of algebraic functions: linear, quadratic, exponential, logarithmic, rational as well as linear systems with two and three unknowns. Includes applications such as variation, motion, and mixture problems.

MTH 4030 Applications of Algebra **4 QH**
Examines linear equations and their graphs, systems of equations, and linear inequalities in two variables with application to linear programming. Introduces matrices and cryptography, set theory, techniques of counting permutations, combinations, and elementary probability.

MTH 4040 College Mathematics for Business **4 QH**
Focuses on using the TI-83 graphing calculator to solve and graph various nonlinear functions, such as quadratic, exponential, logarithmic, and logistic equations. Applies modeling, scatter plots, and finding the "best fit" equation to real-world problems in business and other fields. Concentrates on solving finance problems, including annuities and loans in the second half of the course. Requires a business project analyzing a publicly traded company's performance. A TI-83 graphing calculator is required.

POL 4106 Introduction to Politics **4 QH**
Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as illustrations of the institutional distinction between a totalitarian and a constitutional system.

SOC 4010 Principles of Sociology 1 **4 QH**
Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

SOC 4011 Principles of Sociology 2 **4 QH**
Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change. *Prereq. SOC 4010.*

English as a Second Language

ESL 1011 Beginning Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for basic-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1012 Low-Intermediate Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for low intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1013 Intermediate Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1014 High-Intermediate Core-Structure and Communication **0 QH**
Integrates instruction in grammar, listening, and speaking for high intermediate-level students. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1015 Advanced Core-Structure and Communication **0 QH**
Focuses on listening, speaking, note-taking, and presentation skills with selective grammar review for advanced-level students. Targets skills for academic success in the University. Aims to increase accuracy and fluency in communication with extensive small group practice and additional assignments in the listening and video labs. Provides opportunities for conversation with English-speaking peers from the University.

ESL 1021 Beginning Reading **0 QH**
Provides guided reading practice to basic-level students. Uses materials designed for students with limited vocabulary and knowledge of English. Focuses on vocabulary development and comprehension of short passages. Encourages active participation and discussion.

ESL 1022 Low-Intermediate Reading **0 QH**
Provides reading practice to intermediate-level students. Introduces strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing. Targets vocabulary development. Encourages discussion based on the readings.

ESL 1023 Intermediate Reading **0 QH**
Provides reading practice to intermediate-level students. Covers strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing. Targets vocabulary development. Encourages discussion based on the readings.

ESL 1024 High-Intermediate Reading **0 QH**
Provides reading practice to high intermediate-level students. Applies strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing through intensive and extensive reading of a variety of texts: fiction, autobiography, articles of general interest, and selections from university-level textbooks. Continues development of vocabulary. Encourages discussion based on the readings.

ESL 1025 Advanced Reading **0 QH**
Provides reading practice to advanced-level students. Applies strategies for efficient reading: skimming, scanning, identifying main idea and support, making inferences, and summarizing through intensive and extensive reading of a variety of texts: fiction, autobiography, articles of general interest, and selections from university-level textbooks. Continues development of vocabulary. Encourages discussion based on the readings.

ESL 1031 Beginning Composition **0 QH**
Focuses on paragraph development for beginning students with limited grammar and vocabulary. Provides practice with punctuation, spelling, capitalization, and topic and supporting sentences.

ESL 1032 Low-Intermediate Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for low intermediate-level students. Focuses on writing well-organized and effectively developed paragraphs.

ESL 1033 Intermediate Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for intermediate students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1034 High-Intermediate Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for high intermediate-level students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1035 Advanced Composition **0 QH**
Provides intensive practice in composition with emphasis on grammatical accuracy and clarity of content for advanced students. Focuses on writing well-organized and effectively developed paragraphs. Gives special attention to individual writing needs. Reviews grammar points identified as problem areas for individual writers in the class.

ESL 1044 High-Intermediate Listening/Speaking-Pronunciation **0 QH**
Focuses on aspects of English pronunciation, including the sounds of vowels and consonants, as well as the patterning of stress and intonation, that aid non-native speakers in speaking intelligibly in English. Develops active listening strategies to improve comprehension. Provides a variety of speaking activities and directed laboratory practice.

ESL 1045 Advanced Listening/Speaking **0 QH**
Explores techniques of effective oral communication and provides opportunities for extensive practice. Develops active listening strategies to improve comprehension and provides opportunities for additional, self-directed study in the listening and video labs.

ESL 1054 High-Intermediate Intensive Grammar **0 QH**
Provides extensive practice and review of major grammatical points with the aim of increasing command of the structures of English and improving writing skills.

ESL 1090 Business Language Skills (Advanced) **0 QH**
Serves as a preparatory course using business cases for non-native-speaking professionals and graduate students entering American MBA programs. Focuses on presentation skills and strategies for participation in bargaining sessions; participants receive practice in writing business case analyses, performance appraisals, reports, and team business plans.

Appendix

Campus Map


Boston
Massachusetts
Back Bay / Fens
400 The Fenway
FENWAY
Museum of Fine Arts
FORSYTH WAY
Forsyth Way
HEMENWAY STREET
GAINSBOROUGH STREET
Symphony Road
WESTLAND AVENUE
Christian Science Church Center
Horticultural Hall
Symphony Hall
NORTH PARKING AREA
St. Anne's
SPEARE PLACE
ST. STEPHEN STREET
OPERA PLACE
HUNTINGTON AVENUE
LeBeau Park
PARKER STREET
Tavern Road
FIELD STREET PARKING NO. 1
Pilot Street
LEON PARKING AREA
Leon Street
FIELD STREET PARKING NO. 2
RUGGLES STREET
RYDER PARKING AREA
CENTENNIAL COMMON
RUGGLES ST. STATION
FORSYTH STREET
Cabot Court
Krentzman Quadrangle
YMCA
New England Conservatory of Music
ST. BOTOLPH STREET
ROBINSON PARKING AREA
ARENA PARKING AREA
MASS. AVE. STATION
MASSACHUSETTS AVENUE
CAMDEN PARKING AREA
VISITOR/PAY PARKING
MBTA
PARKING GARAGE
ENTRANCE
Carter Playground
COLUMBUS PARKING AREA
COLUMBUS AVENUE
EXIT
DAVENPORT PARKING NO.1
DAVENPORT PARKING NO.2
Davenport Street
Douglass Park
Boston Street
Berlin Street
Cranwell Street
Oxford Street
TREMONT STREET
TREMONT PARKING AREA
MELNEA CASS BOULEVARD

Academic and Service Buildings

22 John D. O'Bryant African-American Institute (AF)
12 Barletta Natatorium (BN)
19 Boiler Plant
11 Cabot Physical Education Building (CB) TTY: Rm 110
39 Cahners Hall (CA) TTY: Rm 151
28 Cargill Hall (CG)
13 Churchill Hall (CH)
62 Classroom Building (CL)
59 Columbus Place (716 Columbus Avenue) (CP)
9 Cullinane Hall (CN)
4 John A. and Marcia E. Curry Student Center (Student Lounge) (SC) TTY: Rm 255
40 Cushing Hall (CU)
14 Dana Research Center (DA)
27 Dockser Hall (DK) TTY: Rm 107
Dodge Hall (DG)
61 Maureen and Richard J. Egan Engineering/Science Research Center
3 Ell Student Building (Auditorium) (EL) TTY: Rms 04,104
56 Field Street (FS)
16 Forsyth Building (FR) TTY: Rms 100, 135
17 Forsyth Building Annex (FA)
38 Forsyth Dental Building (FE)
1 Hayden Hall (HA) TTY: Rms 120, 202
33 Hillel-Frager (HF)
24 Holmes Hall (HO) TTY: Rm 276
10 Hurtig Hall (HT)
26 Kariotis Hall (KA)
41 Kerr Hall (Faculty Center) (KH)
29 Knowles Center (KN)
25 Lake Hall (LA) TTY: Rm 203
63 Roger M. and Michelle S. Marino Recreation Center
57 Matthews Arena (MA)
58 Matthews Arena Annex (MX)
20 Meserve Hall (ME) TTY: Rm 305
5 Mugar Life Science Building (Peabody Health Professions Center) (MU)
18 Nightingale Hall (NI) TTY: Rm 125
31 Parker Building (PA)
64 Renaissance Park
2 Richards Hall (RI) TTY: Rms 150, 254
8 Robinson Hall (RB)
21 Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
50 122 St. Stephen Street (SS)
15 Snell Engineering Center (SN) TTY: Rm 120
60 Snell Library (SL) TTY: Reference Desk
30 Stearns Center (ST) TTY: Rm 302
32 26 Tavern Road (TA)

Residence Buildings

34 Burstein Hall
54 400 The Fenway
46 142–148 Hemenway Street
45 153 Hemenway Street and Loftman Hall
7 316 Huntington Avenue (Northeastern at the YMCA)
52 319 Huntington Avenue
51 337 Huntington Avenue
36 407 Huntington Avenue
43 Kennedy Hall
41 Kerr Hall
53 Light Hall
45 Loftman Hall and 153 Hemenway Street
42 Melvin Hall
35 Rubenstein Hall
50 106/110/116/122 St. Stephen Street
44 Smith Hall
49 Speare Hall
48 Stetson East TTY (public)
47 Stetson West
65 West Campus Residence Hall A (scheduled to open fall 1999)
37 White Hall
23 Willis Hall

Key

Academic, residential, and service buildings

Handicap parking

Accessible routes

Parking areas

Street direction

Underground tunnel

Emergency telephone

TTY locations
See alphabetic list of buildings for **TTY** locations.

TTY: Rm 000

Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 4/99

Academic Calendar 1999–2000

1999

September	3–Sept. 17	Friday–Friday	Vacation.
	6	Monday	**Labor Day.** University closed.
	16	Thursday	**Fall Commencement.**
	17–22	Friday–Wednesday	Orientation and registration for freshmen and transfer students.
	20	Monday	Upperclass registration.
	23	Thursday	Classes begin in undergraduate full-time day programs for fall quarter.
October	11	Monday	**Columbus Day.** University closed.
November	11	Thursday	**Veterans Day.** University closed.
	25	Thursday	**Thanksgiving Day.** University closed.
	25–27	Thursday–Saturday	**Thanksgiving** recess. University closed except key offices.
December	9	Thursday	Reading day.
	10–16	Friday–Thursday	Fall final examinations for undergraduate full-time day programs.
	17–Jan. 3	Friday–Monday	Vacation.

2000

January	4–5	Tuesday–Wednesday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students.
	6	Thursday	Classes begin in undergraduate full-time day programs for winter quarter.
	17	Monday	**Martin Luther King Jr.'s Birthday** observed. University closed.
February	21	Monday	**Presidents' Day.** University operates on a normal class schedule.
March	13–17	Monday–Friday	Winter final examinations for undergraduate full-time day programs.
	20–24	Monday–Friday	Vacation.
	27–28	Monday–Tuesday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students.
	29	Wednesday	Classes begin in undergraduate full-time day programs for spring quarter.
April	17	Monday	**Patriots' Day.** University operates on a normal class schedule.
May	29	Monday	**Memorial Day.** University closed.

June	5–9	Monday–Friday	Spring final examinations for undergraduate full-time day programs.
	12–16	Monday–Friday	Vacation.
	17	Saturday	**Commencement.**
	19	Monday	Registration for returning upperclass students and January freshmen (Quarter 3).
	20	Tuesday	Classes begin in undergraduate full-time day programs for summer quarter.
July	4	Tuesday	**Independence Day.** University closed.
August	28–31	Monday–Thursday	Summer final examinations for undergraduate full-time day programs.
September	1–15	Friday–Friday	Vacation.
	4	Monday	**Labor Day.** University closed.
	12	Tuesday	**Fall Commencement.**

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

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Donnie Perkins
Office of Affirmative Action
424 Columbus Place
Northeastern University
Boston, Massachusetts 02115
617.373.2133

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